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U.S. APPLICATION NUMBER NO	FIRST NAMED APPLICANT	ATTY DOCKET NO
10/069,915	Thomas Haagen	47893/DBP/M521

23363
 CHRISTIE, PARKER & HALE, LLP
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INTERNATIONAL APPLICATION NO

PCT/DE00/03053

IA FILING DATE

08/30/2000

PRIORITY DATE

08/30/1999

CONFIRMATION NO. 7069

371 ACCEPTANCE LETTER



OC00000008049667

Date Mailed: 05/14/2002

NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.494 OR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office in its capacity as an Elected Office (37 CFR 1.495), has determined that the above identified international application has met the requirements of 35 U.S.C. 371, and is ACCEPTED for national patentability examination in the United States Patent and Trademark Office.

The United States Application Number assigned to the application is shown above and the relevant dates are:

02/28/2002
 DATE OF RECEIPT OF 35 U.S.C. 371(c)(1), (c)(2) and
 (c)(4) REQUIREMENTS

02/28/2002
 DATE OF RECEIPT OF ALL 35 U.S.C.
 REQUIREMENTS

A Filing Receipt (PTO-103X) will be issued for the present application in due course. **THE DATE APPEARING ON THE FILING RECEIPT AS THE " FILING DATE" IS THE DATE ON WHICH THE LAST OF THE 35 U.S.C. 371 REQUIREMENTS HAS BEEN RECEIVED IN THE OFFICE. THIS DATE IS SHOWN ABOVE.** *The filing date of the above identified application is the international filing date of the international application (Article 11(3) and 35 U.S.C. 363).* Once the Filing Receipt has been received, send all correspondence to the Group Art Unit designated thereon.

The following items have been received:

- U.S. Basic National Fee
- Copy of IPE Report
- Copy of references cited in ISR
- Copy of the International Application
- Copy of the International Search Report
- Information Disclosure Statements
- Oath or Declaration
- Preliminary Amendments
- Request for Immediate Examination

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

BARBARA A CAMPBELL

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PART 3 - OFFICE COPY

FORM PCT/DO/EO/903 (371 Acceptance Notice)

[illegible]

FORM PTO-1390
(REV 3/2001)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

DATE: February 28, 2002

EXPRESS MAIL LABEL NO.
EL717377807USATTORNEY DOCKET NO.
47893/DBP/M521

U.S. APPLICATION NO.

10/069915

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371INTERNATIONAL APPLICATION NO.
PCT/DE00/03053INTERNATIONAL FILING DATE
August 30, 2000PRIORITY DATE CLAIMED
August 30, 1999

TITLE OF INVENTION

DOOR MODULE FOR FIXING TO A DOOR BODY FORMING A BASE COMPONENT OF A MOTOR
VEHICLE DOOR AND METHOD FOR ASSEMBLING A DOOR MODULE OF THIS KIND

APPLICANT(S) FOR DO/EO/US

HAAGEN, Thomas, and SLAVIK, Thomas

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/LUS).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 13 to 20 below concern document(s) or other information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A FIRST preliminary amendment.
16. ☐ A SECOND or SUBSEQUENT preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ SMALL ENTITY Assertion: Applicant(s) and any other associated with it/them under 37 CFR § 1.27(a) are a small entity.
20. ☒ Certificate of Mailing by Express Mail.
21. ☒ Other items or information: A.) Incorporation of Annexes to IPEA and Int. Appln. B.) Extra Set of Drawings

10/069915

U.S. APPLICATION NO (If known, see 37 CFR 1.5) N/A		INTERNATIONAL APPLICATION NO PCT/DE00/03053		ATTORNEY DOCKET NO 47893/DBP	
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21. The following fees are submitted: <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO: \$1,040.00 <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO: \$890.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO: \$740.00 <input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4): \$710.00 <input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4): \$100.00				CALCULATIONS		PTO USE ONLY	
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$ 890			
Surcharge of \$130 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$			
Claims	Number Filed	Number Extra	Rate				
Total Claims	39+14 -20=	33	X \$18	\$ 594			
Independent Claims	1 -3=	0	X \$84	\$			
Multiple dependent claim(s) (if applicable)			+ \$280	\$ 280			
TOTAL OF ABOVE CALCULATIONS =				\$ 1,764			
Reduction by 1/2 for filing by small entity, if applicable. Verified Small entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).				\$			
SUBTOTAL =				\$ 1,764			
Processing fee of \$130 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$			
TOTAL NATIONAL FEE =				\$ 1,764			
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				\$			
TOTAL FEES ENCLOSED =				\$ 1,764			
Note (1): The basic national fee must be paid when filing this application. The 20-month time limit (37 CFR § 1.494) and 30-month time limit (37 CFR § 1.495) are not extendable.				Amount to be: refunded \$			
				charged \$			

a. ☒ A check in the amount of \$ 1,764.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 03-1728. A duplicate copy of this sheet is enclosed.

NOTE (2): Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

D. Bruce Prout
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By D. Bruce Prout
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

EXPRESS MAIL NO. EL717377807US

Applicant : Thomas Haagen, et al.
Application No. : N/A
Filed : February 28, 2002
Title : DOOR MODULE FOR FIXING TO A DOOR BODY FORMING A BASE
COMPONENT OF A MOTOR VEHICLE DOOR AND METHOD FOR
ASSEMBLING A DOOR MODULE OF THIS KIND

Docket No. : 47893/DBP/M521

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Post Office Box 7068
Pasadena, CA 91109-7068
February 28, 2002

Commissioner:

Please amend the above-identified application as follows:

IN THE SPECIFICATION

After the title please add the following:

-- CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority of International application number PCT/DE00/03053, filed August 30, 2000, which in turn claims priority of German application number 199 42 650.3, filed August 30, 1999--.

IN THE CLAIMS

By this Amendment, Applicants are amending claims 4-8, 10, 13, 16-18, 21-24, 26-30, 34-36, and 39. Pending claims 1 to 39 follow.

1. Door module for fixing to a door body (9) forming a door base component of a motor vehicle door with
 - a frame structure comprising a window frame (10) with guide for a window pane (8)

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- an assembly carrier (4) for holding function components of the vehicle door on which at least the structural elements of a window lifter holding the window pane (8) are prefitted, and
- at least one fixing node (2, 3) provided on the frame structure and through which the frame structure can be connected to the door body (9)

characterised in that

the at least one fixing node (2, 3) has means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) relative to the fixing node (2, 3) and aggregate support (4) substantially transverse to the door plane (xz-plane) in which the aggregate support (4) extends.

2. Door module according to claim 1 characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) relative to the fixing node (2, 3) substantially transverse to the door plane (xz-plane) are provided on the fixing node (2, 3).

3. Door module according to claim 1 or 2 characterised in that the fixing node (2, 3) is formed by a separate structural part of the door module (1- 4).

4. (Amended) Door module according to claim 1 characterised in that the fixing node (2, 3) is mounted in the region of an upper end section (42) of the assembly carrier (4) facing the window opening.

5. (Amended) Door module according to claim 1 characterised in that the fixing node (2, 3) protrudes in the door plane (xz-plane) laterally from the assembly carrier (4).

6. (Amended) Door module according to claim 1 characterised in that the fixing node (2, 3) is formed like a housing for holding the parts of the window frame (10) as well as the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10).

7. (Amended) Door module according to claim 1 characterised in that the fixing node (2, 3) and the assembly carrier (4) form one structural unit relative to which the position of the window frame (10) can be adjusted.

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8. (Amended) Door module according to claim 1 characterised in that the window frame (10) is adjustable substantially transversely to the door plane (xz-plane) both in respect of the assembly carrier (4) and in respect of the door body (9).

9. Door module according to claim 8 characterised in that the window frame (10) is associated with a front and a rear fixing node (2, 3) in relation to the longitudinal axis of the vehicle, wherein preferably each of the two fixing nodes (2, 3) has means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10).

10. (Amended) Door module according to claim 1 characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) are provided for swivelling the window frame (10) relative to the fixing node (2, 3).

11. Door module according to claim 10 characterised in that the window frame (10) is able to swivel relative to the fixing node (2, 3) about an axis running substantially towards the longitudinal axis (x) of the vehicle.

12. Door module according to claim 10 or 11 characterised in that the window frame (10) and the fixing node (2, 3) interact on the ball and socket principle.

13. (Amended) Door module according to claim 1 characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) comprise a wedge (6) which is mounted between the window frame (10) and fixing node (2, 3).

14. Door module according to claim 13 characterised in that the wedge (6) is displaceable in the door plane (xz-plane), more particularly transverse to the longitudinal axis (x) of the vehicle between the fixing node (2, 3) and the window frame (10).

15. Door module according to claim 14 characterised in that the wedge (6) is able to swivel in the door plane (xz-plane) between the fixing node (2, 3) and the window frame (10).

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16. (Amended) Door module according to claim 1 characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) act independently of the fixing means (63, 64) through which the window frame (10) is connected to the fixing node (2, 3).

17. (Amended) Door module according to claim 1 characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) can be locked in a defined position through the fixing means (63, 64).

18. (Amended) Door module according to claim 1 characterised in that the door module (1 - 4) has means (7, 42, 43) for reinforcing the door.

19. Door module according to claim 18 characterised in that the means (7, 42) for reinforcing the door are provided in the breast area (B) of the door.

20. Door module according to claim 18 or 19 characterised in that the means (7, 42) for reinforcing the door comprise a longitudinally extended reinforcement element (7) which extends in the vehicle longitudinal direction (x) and is connected to the or each fixing node (2, 3).

21. (Amended) Door module according to claim 20 characterised in that the means (7, 42) for reinforcing the door extend between the two fixing nodes (2, 3) and are connected to each of the two fixing nodes (2, 3).

22. (Amended) Door module according to claim 20 characterised in that the longitudinally extended reinforcement element (7) is formed tubular at least in the region of the or each fixing node (2, 3).

23. (Amended) Door module according to claim 20 characterised in that the longitudinally extended reinforcement element (7) is supported on the or each fixing node (2, 3).

24. (Amended) Door module according to claim 20 characterised in that the longitudinally extended reinforcement element (7) is connected with keyed engagement to the or each fixing node (2, 3).

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25. Door module according to claim 24 characterised in that the keyed connection is formed by a plug fit connection.

26. (Amended) Door module according to claim 20 characterised in that the longitudinally extended reinforcement element (7) is additionally connected to the assembly carrier (4), more particularly through a material-bonding connection.

27. (Amended) Door module according to claim 20 characterised in that the assembly carrier (4) is strengthened and/or profiled in the region of the longitudinally extended reinforcement element (7).

28. (Amended) Door module according to claim 1 characterised in that function components (51 - 54) of the vehicle door are prefitted on the assembly carrier (4).

29. (Amended) Door module according to claim 1 characterised in that at least one fixing node (2, 3) has means (23a, 23b, 33a, 33b) for adjusting the position of the fixing node relative to the door body (9) in the vehicle longitudinal direction (x) and/or transverse to the door plane (xz-plane), and these means can interact with corresponding means (97a, 97b, 98a, 98b) of the door body (9).

30. (Amended) Motor vehicle door having a door body (9) forming a base component of the door and having a door module (1 - 4) according to claim 1 which can be connected to the door body (9).

31. Motor vehicle door according to claim 30 characterised in that the door module (1 - 4) can be pushed by at least one section (12, 27) of its frame structure (1) into the door body (9).

32. Motor vehicle door according to claim 30 or 31 characterised in that the position of the door module (1 - 4) can be adjusted relative to the door body (9) in the vehicle longitudinal direction (x) and/or transverse to the door plane (xz-plane).

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33. Motor vehicle door according to claim 32 characterised in that in order to adjust the position of the door module (1 - 4) relative to the door body (9) at least one bolt (102, 103) is provided which is associated with an oblong hole (97a, 97b, 98a, 98b) which extends along the relevant adjusting direction.

34. (Amended) Motor vehicle door according to claim 32 characterised in that in order to adjust the position of the door module (1 - 4) the position of the at least one fixing node (2, 3) is adjustable relative to the door body (9).

35. (Amended) Motor vehicle door according to claim 30 characterised in that the door module (1 - 4) can be connected to the door body (9) substantially without any adjustment play perpendicular to the door plane (xz-plane).

36. (Amended) Method for assembling a vehicle door according to claim 30 which comprises a door body (9) forming a base component of the door, as well as a door module (1 - 4), wherein the door module (1 - 4) has the following:

- a frame structure which comprises a window frame (10) with a guide for a window pane (8)
- an aggregate support (4) for holding function components of the vehicle door, on which at least the structural elements of a window lifter holding the window pane (8) are prefitted, and
- at least one fixing node (2, 3) provided on the frame structure and through which the frame structure can be connected to the door body (9)

characterised in that

prior to connecting the door module (1 - 4) to the door body (9) the position of the window frame (10) is adjusted relative to the fixing node (2, 3) and the aggregate support substantially transverse to the door plane (xz-plane) in which the aggregate support (4) extends.

37. Method according to claim 36 characterised in that adjusting the position of the window frame (10) is carried out by swivelling the window frame (10) about an axis (x-axis) lying in the door plane (xz-plane).

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38. Method according to claim 36 or 37 characterised in that when fitting together the door module (1 - 4) and door body (9) the position of the door module (1 - 4) relative to the door body (9) is adjusted solely in the door plane (xz-plane).

39. (Amended) Method according to claim 36 characterised in that when assembling and adjusting the individual door elements (1 - 4, 9, 10) gauges are used by means of which reference points of the individual door elements (1 - 4, 9, 10) are set in relation to each other.

REMARKS

Claims 1-39 remain in the application. Claims 4-8, 10, 13, 16-18, 21-24, 26-30, 34-36, and 39 have been amended. It is respectfully requested that the foregoing preliminary amendment be entered prior to examination.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

Respectfully submitted,

CHRISTIE, PARKER & HALE, LLP

By D Bruce Prout
D. Bruce Prout
Reg. No. 20,958
626/795-9900

DBP/aam

VERSION WITH MARKINGS TO SHOW CHANGES MADE

4. (Amended) Door module according to ~~[one of the preceding claims]~~ claim 1 characterised in that the fixing node (2, 3) is mounted in the region of an upper end section (42) of the assembly carrier (4) facing the window opening.
5. (Amended) Door module according to ~~[one of the preceding claims]~~ claim 1 characterised in that the fixing node (2, 3) protrudes in the door plane (xz-plane) laterally from the assembly carrier (4).
6. (Amended) Door module according to ~~[one of the preceding claims]~~ claim 1 characterised in that the fixing node (2, 3) is formed like a housing for holding the parts of the window frame (10) as well as the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10).
7. (Amended) Door module according to ~~[one of the preceding claims]~~ claim 1 characterised in that the fixing node (2, 3) and the assembly carrier (4) form one structural unit relative to which the position of the window frame (10) can be adjusted.
8. (Amended) Door module according to ~~[one of the preceding claims]~~ claim 1 characterised in that the window frame (10) is adjustable substantially transversely to the door plane (xz-plane) both in respect of the assembly carrier (4) and in respect of the door body (9).
10. (Amended) Door module according to ~~[one of the preceding claims]~~ claim 1 characterised in that the means (6, 21, 22, 31 32) for adjusting the position of the window frame (10) are provided for swivelling the window frame (10) relative to the fixing node (2, 3).
13. (Amended) Door module according to ~~[one of the preceding claims]~~ claim 1 characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) comprise a wedge (6) which is mounted between the window frame (10) and fixing node (2, 3).
16. (Amended) Door module according to ~~[one of the preceding claims]~~ claim 1 characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) act independently of the fixing means (63, 64) through which the window frame (10) is connected to the fixing node (2, 3).

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17. (Amended) Door module according to ~~[one of the preceding claims]~~ claim 1 characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) can be locked in a defined position through the fixing means (63, 64).

18. (Amended) Door module according to ~~[one of the preceding claims]~~ claim 1 characterised in that the door module (1 - 4) has means (7, 42, 43) for reinforcing the door.

21. (Amended) Door module according to claim ~~[9 and claim]~~ 20 characterised in that the means (7, 42) for reinforcing the door extend between the two fixing nodes (2, 3) and are connected to each of the two fixing nodes (2, 3).

22. (Amended) Door module according to claim 20~~[or 21]~~ characterised in that the longitudinally extended reinforcement element (7) is formed tubular at least in the region of the or each fixing node (2, 3).

23. (Amended) Door module according to ~~[one of claims 20 to 22]~~ claim 20 characterised in that the longitudinally extended reinforcement element (7) is supported on the or each fixing node (2, 3).

24. (Amended) Door module according to ~~[one of claims 20 to 23]~~ claim 20 characterised in that the longitudinally extended reinforcement element (7) is connected with keyed engagement to the or each fixing node (2, 3).

26. (Amended) Door module according to ~~[one of claims 20 to 25]~~ claim 20 characterised in that the longitudinally extended reinforcement element (7) is additionally connected to the assembly carrier (4), more particularly through a material-bonding connection.

27. (Amended) Door module according to ~~[one of claims 20 to 26]~~ claim 20 characterised in that the assembly carrier (4) is strengthened and/or profiled in the region of the longitudinally extended reinforcement element (7).

28. (Amended) Door module according to ~~[one of the preceding claims]~~ claim 1 characterised in that function components (51 - 54) of the vehicle door are prefitted on the assembly carrier (4).

29. (Amended) Door module according to ~~[one of the preceding claims]~~ claim 1 characterised in that at least one fixing node (2, 3) has means (23a, 23b, 33a, 33b) for adjusting the position of the fixing node relative to the door body (9) in the vehicle longitudinal direction (x) and/or

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transverse to the door plane (xz-plane), and these means can interact with corresponding means (97a, 97b, 98a, 98b) of the door body (9).

30. (Amended) Motor vehicle door having a door body (9) forming a base component of the door and having a door module (1 - 4) according to ~~[one of the preceding claims]~~ claim 1 which can be connected to the door body (9).

34. (Amended) Motor vehicle door according to claim 32~~[or 33]~~ characterised in that in order to adjust the position of the door module (1 - 4) the position of the at least one fixing node (2, 3) is adjustable relative to the door body (9).

35. (Amended) Motor vehicle door according to ~~[one of claims 30 to 34]~~ claim 30 characterised in that the door module (1 - 4) can be connected to the door body (9) substantially without any adjustment play perpendicular to the door plane (xz-plane).

36. (Amended) Method for assembling a vehicle door according to ~~[one of claims 30 to 35]~~ claim 30 which comprises a door body (9) forming a base component of the door, as well as a door module (1 - 4), wherein the door module (1 - 4) has the following:

- a frame structure which comprises a window frame (10) with a guide for a window pane (8)
- an aggregate support (4) for holding function components of the vehicle door, on which at least the structural elements of a window lifter holding the window pane (8) are prefitted, and
- at least one fixing node (2, 3) provided on the frame structure and through which the frame structure can be connected to the door body (9)

characterised in that

prior to connecting the door module (1 - 4) to the door body (9) the position of the window frame (10) is adjusted relative to the fixing node (2, 3) and the aggregate support substantially transverse to the door plane (xz-plane) in which the aggregate support (4) extends.

39. (Amended) Method according to ~~[one of claims 36 to 39]~~ claim 36 characterised in that when assembling and adjusting the individual door elements (1 - 4, 9, 10) gauges are used by means of which reference points of the individual door elements (1 - 4, 9, 10) are set in relation to each other.

10/069915

JC19 Rec'd PCT/PTJ 2 8 FEB 2002

**ENGLISH TRANSLATION OF
INTERNATIONAL APPLICATION
WITH ANNEXES TO THE IPER
INCORPORATED
(PCT/DE00/03053)**

10/069915
JC19 Rec'd PCT/PTJ
2 8 FEB 2002

DOOR MODULE FOR FIXING TO A DOOR BODY FORMING A BASE
COMPONENT OF A MOTOR VEHICLE DOOR AND METHOD FOR
ASSEMBLING A DOOR MODULE OF THIS KIND

5 Description

10 The invention relates to a door module for fixing on a door body forming a base component of a motor vehicle door according to the preamble of patent claim 1 as well as to a method for assembling a door module of this kind.

15 A door module of the generic kind comprises a frame structure having a window frame, a flat surface assembly carrier for holding function components of the vehicle door, on which at least the structural elements of the lift mechanism of a window lifter holding a window pane are pre-fitted, and one or more fixing nodes provided on the frame structure, where these fixing nodes are fixing sites provided on the frame structure through which the
20 frame structure can be connected to the door body.

25 By door body is meant here in particular a base component of a door having an outside door panel and an inside door panel which has a large-surface cut-out section which can be covered by the assembly carrier, or a holder for the assembly carrier which is connected to the outside panel of the door and extends towards the inside space of the vehicle, with the base component forming together with the door frame and assembly carrier the essential supporting
30 door components on which the additional function components of the vehicle door are fixed.

By structural components of a window lifter holding the window pane are meant those structural components of the window lifter which support the window pane and thereby fix its position in the vehicle door, thus in the case of
5 a cable window lifter in particular the guide rail and the follower guided on the guide rail and in the case of an arm window lifter, more particularly the at least one lever arm and the associated window pane socket.

10 A door module of the kind already described is known from German patent specification 997 009.

In US PS 5 927 021 a vehicle door is described which consists of a door body and a door frame with assembly
15 carrier fixable on the door body. The door frame and assembly carrier are hereby combined into one structural unit and together are connected with swivel movement to the door body through adjusting means. The adjusting means which are provided for adjusting the door frame
20 together with the assembly carrier relative to the body are thereby mounted on the door body.

From EP 0 405 159 A1 a vehicle door is known having a door body in which the door frame is integrated as a
25 constituent part and on which an assembly carrier can be fixed in the form of two rails. There is no possibility for adjusting the door frame relative to the door body.

The object of the invention is therefore to improve the
30 known door module so that the assembly of the vehicle door is facilitated, particularly with regard to adjusting the position of the different door components relative to each other.

This is achieved according to the invention by providing a door module having the features of patent claim 1.

According to this the door module has on the or each
5 fastening node means for adjusting the position of the window frame relative to the fixing node substantially transversely to the plane (door plane) in which the assembly carrier extends, i.e. the window frame is adjustable so that the adjusting movement has a component
10 across the door plane.

The phrase "substantially across the door plane" is to refer to the fact that the plane defined by a vehicle door or its assembly carrier has as a rule curvatures and
15 moulded areas so that the definition of a door plane can always only be approximate.

The solution according to the invention has the advantage that when fitting together the door module a precise
20 alignment of the window frame is possible relative to the or each fixing node transversely to the door plane (in which in particular the assembly carrier lies) so that the alignment of the window frame can be adapted precisely to the requirements demanded by the construction of the door
25 body.

Preferably the means for adjusting the position of the window frame relative to the fixing node are provided solely on the or each fixing node.

30 The fixing node can be formed by a separate component part of the door module which can be fixedly connected to the assembly carrier and which holds the window frame adjustable.

35

In a preferred embodiment of the invention the fixing node is mounted in the region of the upper end section of the assembly carrier facing the window opening whereby it protrudes at the same time in the door plane (xz-plane) laterally from the assembly carrier.

The fixing node is formed like a housing to hold parts of the window frame as well as means for adjusting the position of the window frame.

The or each fixing node and the assembly carrier preferably form one pre-mountable structural unit, in respect of which the window frame can be adjusted across the extension plane of the assembly carrier. For this purpose the or each fixing node and the assembly carrier are connected together in suitable manner.

During later assembly of the door module with the door body by connecting the fixing node to the door body it is then only necessary to adjust the door module relative to the door body within the door plane (extension plane of the assembly carrier). The connection between the door module and door body can take place across the door plane without any adjusting play. The or each fixing node can have for this purpose an assembly pin which can be inserted into a corresponding socket of the door body and thereby enables a substantially play-free fixing of the relevant fixing node on the door body transverse to the door plane.

Through the said measures it becomes possible for the window frame to be adjusted (by swivelling) both relative to the door body and to the assembly carrier transverse to the door plane whereby the adjustment of the window frame is undertaken directly relative to the fixing node, and

the door body as well as the assembly carrier are fixed relative to the fixing node without any adjusting play perpendicular to the door plane.

- 5 If the door module has two fixing nodes then these are arranged one behind the other relative to the longitudinal direction of the vehicle so that - in relation to the front vehicle door - the one fixing node is associated with the A-pillar of the vehicle and the other fixing node
10 with the B-pillar of the vehicle. Each of the two fixing nodes can hereby have means for adjusting the position of the window frame or these means are associated with only one of the fixing nodes, and in the region of the other fixing node the adjustment of the window frame is only
15 completed passively.

- Adjusting the position of the window frame across the door plane takes place in particular by swivelling the window frame about a swivel axis running substantially parallel
20 to the longitudinal axis of the vehicle. To this end the window frame and the relevant fixing node preferably interact on the ball and socket principle, and a wedge is provided which with one wedge face bears against the fixing node and with an other wedge face bears against the
25 window frame and can be displaced between the fixing node and the window frame in order to trigger swivel movement of the window frame relative to the fixing node. Instead of a displaceable wedge, a wedge can also be provided which can swivel in the door plane.

- 30 Swivelling the window frame is a special case of those particularly preferred adjusting movements where the component of the adjusting movement across the door plane is greater than the component lying in the door plane,
35 thus form the main components of the adjusting movement.

The means for adjusting the position of the window frame should act independently of the fixing means through which the window frame is connected to the relevant fixing node. This means that the means for adjusting the position of
5 the window frame relative to the fixing node are separate adjusting means which after first pre-fitting the window frame on the fixing node enable a deliberate adjustment of the position of the window frame relative to the fixing node. Only then can the final fixing of the window frame
10 on the fixing node take place whereby the fixing means used for this preferably at the same time lock the previously set position of the window frame.

In a preferred embodiment of the invention the door module
15 has additionally means for reinforcing the door, which are provided in the breast area of the door without any such means extending in the longitudinal direction of the vehicle.

20 The means for reinforcing the door preferably comprise a longitudinally extended reinforcement element which runs in the longitudinal direction of the vehicle between two fixing nodes and is fixed on same.

25 In order to enable a keyed connection between the longitudinally extended reinforcement and the fixing node the longitudinally extended reinforcement element is formed tubular at least in the region of the fixing node and can be fitted onto corresponding pins of the fixing
30 node in the manner of a plug-fit connection. The longitudinally extended reinforcement element is hereby supported on the fixing node at the same time.

Alternatively obviously a tubular section can be provided on the fixing node and is associated with a corresponding pin of the longitudinally extended reinforcement element.

- 5 In a preferred further development the longitudinally extended reinforcement element is additionally connected to the assembly carrier, more particularly by welding, and the assembly carrier has in the region of the longitudinally extended reinforcement element a material
10 strengthening and/or a longitudinally extended profiled shape wherein the latter can surround at least in part the reinforcement element. The reinforcement of the vehicle door in the breast area is hereby optimized.

- 15 Apart from the window lifter further function components of the vehicle door can also be pre-fitted on the assembly carrier.

- In a vehicle door which consists of a door body forming a
20 door base part and of a door module according to one of the preceding claims, the door module on the one hand and the door body on the other are preferably formed so that the door module can be pushed with at least one section of its frame structure into the door body. To this end the
25 door body has a corresponding socket shaft.

- After inserting the door module into the door body it is still possible to adjust the position of the door module relative to the door body in the door plane. To this end
30 bolts can be provided which are associated with corresponding oblong holes extending along the relevant adjustment direction.

- A method for assembling a vehicle door which consists of a
35 door body forming a door base part, and a door module

according to the invention is characterised by the features of claim 31.

According to this when assembling the vehicle door first
5 the position of the window frame is adjusted relative to the or each fixing node transverse to the door plane (extension plane of the assembly carrier) and then the door module is connected to the door body. After
10 connecting the door module to the door body it is possible to carry out an adjustment of these two structural groups relative to each other inside the door plane.

The adjustment and assembly preferably take place by means of gauges which set the relevant reference points in
15 relation to each other.

Further advantages of the invention will now be apparent from the following description of an embodiment illustrated in the drawings in which:

20 Figure 1 shows a perspective view of a window frame associated with a front and rear fixing node;

25 Figure 2 shows a window frame according to Figure 1, with a window pane seal also shown;

Figure 3 shows a section of Figure 2;

30 Figure 4 shows a detailed view of the front fixing node;

Figures 5/6 show details of the rear fixing node in two different perspective views;

Figure 7 shows a perspective view of an assembly carrier on which different function elements of the vehicle door are pre-fitted and which has a reinforcement in the breast area;

Figure 8 shows a door module consisting of a window frame according to Figures 1 to 3, fixing nodes according to Figures 4 to 6 and the assembly carrier according to Figure 7 in the pre-assembled state;

Figure 9 shows a door body which is suitable for holding the door module of Figure 8;

Figure 10 shows an assembly stage during the assembly of the door module and door body;

Figure 11 shows the door module and door body in the assembled state;

Figure 12 shows a section through the illustration according to Figure 11.

Figure 1 shows a frame structure of a vehicle door having a window frame 10 which has a front side frame part 10 and a rear side frame part 11 which are connected together through an upper frame part 13 wherein the window frame has a guide channel 15 for a window pane.

The front frame part 11 is fixed on a front fixing node 2 on which an additional frame section 27 is moulded in one piece. A rear fixing node 3 is associated with the rear frame part 12 in similar manner.

Figure 2 shows additionally a window pane seal 16 which is inserted in the guide channel 15 of the window frame 10.

Figure 3 shows a cross-section through the rear frame part 12 from which it can be seen that the window frame 10 is formed by an aluminium profile 14 of H-shaped cross-section preferably made by the stretch/bending process and having a guide channel 15 in which the pane seal 16 is inserted. The pane seal 16 is substantially U-shaped and holds a window pane 8 between its two arms.

Figure 4 shows the front fixing node 2 (on the A-pillar side) in detail. This fixing node 2 is an aluminium pressure cast component having a base body 20 on which are formed integral a frame section 27, a mirror triangle 29 and a projection 25 for holding an assembly carrier and breast reinforcement.

The base body 20 of the front fixing node 2 holds the front frame part 11 of the window frame in a guide provided specially for same. Between an inner surface 21 of the fixing node and the front frame part 11 is a wedge 6 whose inclined wedge faces converge upwards into a point and which adjoins by one wedge face against the inner surface 21 of the fixing node and by its other wedge face against the front frame part 11.

Since the base body 20 of the front fixing node 2 has on its inner surface 21 facing the front frame part 11 a convex protrusion 22 against which the front frame part 11 bears, the front frame part 11 and the base body 20 of the front fixing node 2 interact in the region of this

protrusion 22 (above the wedge 6) on the ball and socket principle. Moving the wedge 6 upwards therefore leads to a swivel movement of the front frame part 11 and thus of the entire window frame about this protrusion 22, see for
5 this also the cross-section through the front fixing node 2 in the A-pillar side region of a vehicle door according to Figure 12. This swivel movement is due to the fact that displacement of the tapering wedge 6 upwards (towards the protrusion 22) in the region below the protrusion 22
10 causes displacement of the window frame 11 outwards (towards the door outside panel 91 according to Figure 12). This leads above the protrusion 22 to a movement of the window frame 11 in the opposite direction, thus towards the inside of the vehicle. Overall it results in
15 a swivel movement of the window frame 11 about the protrusion 22 of the inner face 21 of the fixing node 2. This is synonymous with a swivel movement of the front frame part 11 and thus of the complete window frame about the longitudinal axis of the vehicle (x-axis, see Figure
20 10) through which the frame part 11 can swivel out of the door plane (xz-plane).

From Figure 4 it can further be seen that the base body 20 of the front fixing node 2 has in the region of the
25 protrusion 22 a fixing opening 23c. This enables the window frame 11 to be fixed on the base body 20 of the fixing node 2 in the region of the protrusion 22 by means of a suitable fixing bolt 63, see Figure 12. It is also apparent that an additional fixing between the base part
30 20 and the front frame part 11 takes place in the region of the wedge 6 by means of a further fixing bolt 64 (for which the wedge has a corresponding oblong hole). Through the two fixing bolts 63, 64 it is possible to fix any adjustment of the door frame 11 relative to the front
35 fixing node 2 which had previously been undertaken by displacing the wedge 6.

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According to Figure 4 the base body 20 of the front fixing node 2 furthermore has a fixing opening 23d which serves for fixing on a door body by means of a fixing screw 103, see Figures 11 and 12.

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From the base body 20 of the front fixing node 2 protrudes a projection 25 which is aligned in the longitudinal direction of the vehicle (x-direction, see Figure 10) and which has two fixing openings 24 for fixing the profiled upper section 42 of an assembly carrier as well as a pin 26 for holding a tubular reinforcement element 7. The profiled section 42 of an assembly carrier bears directly on the projection 25 of the front fixing node 2 and is additionally supported in the longitudinal direction on a support face 25a of the base body 20 of the fixing node 2. The fixing tube 7 is pushed onto the pin 26 and by its inner face 71 of its outer wall 17 bears against this pin. It is additionally supported in the longitudinal direction of the vehicle against a stop face 25b of the projection 25.

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The upper section 42 of the assembly carrier 4 additionally defines at the same time the bottom of the window opening in the door module formed by the frame 10 (see Figures 1, 2, and 8). This window opening is defined through the frame parts 11 - 13 of the window frame 10 as well as through the upper section 42 of the assembly carrier 44 which is provided with a reinforcement element 7.

25

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At the bottom a frame section 27 is moulded on the base body 20 of the fixing node 2 and has reinforcement ribs 27a, a fixing spot in the form of a fixing opening 27b for fixing on a door body as well as a window pane guide 28. The window pane guide 28 in the form of a guide channel continues upwards up to a mirror triangle 29 moulded on

35

the upper side of the base body 22 and on which an outside mirror can be fixed.

Figures 5 and 6 show in two perspective illustrations the rear fixing node 3 (thus the node on the B-pillar side in the case of a front door), which is formed as an aluminium pressure cast component.

The rear fixing node 3 comprises a base body 30 on which a projection 35 is moulded to hold an assembly carrier as well as a tubular reinforcement element. The projection 35 has two fixing spots in the form of fixing openings 34 through which the upper section of an assembly carrier can be fixed on the rear fixing node 3 wherein the assembly carrier can be supported additionally in the longitudinal direction of the vehicle on a stop face 35a of the base body 30 of the rear fixing node 3. Furthermore on the projection 35 there is also a moulded pin 36 extending in the longitudinal direction of the vehicle (x-direction, see Figure 10) and on which a tubular reinforcement element can be pushed whereby this tubular reinforcement element is additionally associated with a stop face 35b on the projection 35 on which it can be supported in the longitudinal direction of the vehicle.

The base body 30 of the rear fixing node 3 has a guide for holding the rear frame part 12 wherein a wedge 6 is inserted between an inner surface 31 of the base body 30 facing the rear frame part 12, and the inner frame part 12, with the two wedge faces converging upwards to a point.

Furthermore the base body 30 of the rear fixing node 3 has on its inner surface 31 facing the frame part 12 a convex shaped protrusion 32 on which the fixing node 3 and the rear frame part 12 interact according to the ball and

socket principle. In the same way as in the front fixing node therefore by sliding the wedge 6 up or down it is possible to achieve a swivel movement of the rear frame part 12 about the longitudinal axis of the vehicle. The upper section of the rear frame part 12 is thereby swivelled towards the inside of the vehicle when the wedge 6 is moved upwards whilst sliding the wedge 6 downwards causes the opposite swivel movement of the frame part 12.

- 10 The base body 30 of the rear fixing node 32 has according to Figures 5 and 6 two fixing openings in the form of threaded holes 33b, 33c of which one is provided in the region of the wedge 6 and the other in the region of the convex protrusion 32. It is thereby clear from Figure 6
- 15 that the wedge 6 is provided with an oblong hole 5a which interacts with the associated fixing opening 33b and also allows after a longitudinal displacement of the wedge 6 the passage of a suitable fixing member on the one side through the fixing opening 33b and on the other through
- 20 the wedge 6. A corresponding oblong hole is also provided in the case of the wedge associated with the front fixing node 2, even though it cannot be seen in Figure 4. Thus by means of suitable fixing bolts it is possible to fix the rear frame part 12 and the rear fixing node 3 against
- 25 each other whereby the adjustment of the frame 12 relative to the fixing node 3 undertaken previously by means of sliding the wedge 6 is now fixed.

Figures 5 and 6 also show a pin 30a of the base body 30 of the fixing node 3 as well as two further fixing openings 33a, 33d. The pin 30a serves for fitting into a corresponding socket of a door body so that the fixing

node 3 is supported there through the pin 30a. The fixing openings 33a, 33d serve to connect the rear fixing node 3 with the door body, see Figures 11 and 12.

- 5 Figure 7 shows an assembly carrier on which a number of function components of a vehicle door are prefitted and which can be assembled together with the frame structure 1 shown in Figure 1 into one door module.
- 10 The assembly carrier consists of a support plate 40 having a recess 41 as well as a profiled upper section 42 which is associated with the breast area of the vehicle door, see Figure 10.
- 15 The profiled section 42 of the assembly carrier 4 has a material reinforcement compared to the support plate 40 wherein the reinforced material section is connected by means of laser welding to the remaining part of the assembly carrier 4. The profiled section 42 of the
- 20 assembly carrier 4 furthermore comprises a longitudinally extending reinforcement element in the form of a tube 7 which extends along the vehicle longitudinal axis (x-axis, see Figure 10). This is likewise connected to the profiled section 42 of the assembly carrier 4 through
- 25 laser welding.

As a result of the stiffening of the assembly carrier 4 in the breast area of the door through profiling the corresponding section 42 of the assembly carrier, by using

30 a material having a greater material thickness compared with the support plate 40 as well as by additionally fitting a longitudinally extending reinforcement element in the form of a tube 7, the assembly carrier 4 is strengthened considerably both in respect of pressure

35 forces (which occur in the event of a front impact crash) and bending forces (following a side impact crash). Thus

important elements are already integrated in the assembly carrier 4 here to secure and strengthen the door against a front or side impact crash; therefore no such reinforcement element need be provided in the door body itself, see Figure 9.

The assembly carrier 4 furthermore has a diagonal reinforcement element 43 which extends over the cut-out section 41 of the support plate 40, as well as a number of fixing sites in the form of fixing openings 46 for connection with a door body, see Figures 10 and 11.

The support plate 40 of the assembly carrier 4 serves to hold a number of function components of the vehicle door which are prefitted on the support plate 40. Thus an arm rest 51 is fixed directly on the support plate 40 and has a grab handle 51a, a door inside opener 51b as well as a number of operating elements 51d wherein the operating elements 51d serve to operate different electrical function elements of the vehicle, e.g. an electric door lock, a window lifter etc. Furthermore the support plate 40 supports an electric door lock 52 which can be locked through one of the operating elements of the operating zone 51d of the arm rest 50 and which is furthermore in active connection with the door inside opener 51b through a coupling element 51c.

Furthermore a window lifter 53 is prefitted on the support plate 40 and comprises an electrical drive unit 53a, a draw member in the form of a cable 53b movable by means of the drive unit 53a, a guide rail 53c as well as a follower 53d which is guided on the guide rail 53c and is movable by means of the draw member 53b. This follower 53d supports the window pane 8 and thus serves to connect the window pane 8 to the window lifter 53. Finally a speaker 54 of an audio unit is fixed on the support plate 40.

Figure 8 shows the door module according to the invention in the assembled state according to which the assembly carrier 4 has been connected to the frame structure 1.

5 Fixing screws 49 are thereby used for fixing which engages on one side through the oblong holes 48 in the upper profiled section 42 of the assembly carrier 4 (see Figure 7) as well as on the other side through the internally threaded fixing openings 24, 34 in the projections 25, 35
10 of the front and rear fixing node 2, 3 (see Figures 4 - 6).

From Figure 8 it is apparent that the longitudinally extended profiled upper section 42 of the assembly carrier
15 4 as well as the longitudinally extended reinforcement element in the form of a tube 7 extend in the breast area B of the door module.

In the state of the door module 4 shown in Figure 8 in
20 which the frame structure 1 and the assembly carrier are connected (initially provisionally), the window frame 7 can be adjusted relative to the fixing nodes 2, 3 and thus also relative to the assembly carrier 4 transverse to the extension plane of the assembly carrier 4 (thus the xz-
25 plane). As already explained in respect of Figures 4 to 6 and 12 this adjustment is undertaken in that inside the front or rear fixing node 2, 3 corresponding wedges are moved up or down along the z-axis which results in a swivel movement of the window frame 10 about an axis
30 (vehicle longitudinal axis) running along the vehicle longitudinal direction (x-direction). The position of the window frame 10 is thus adjusted across the extension plane of the assembly carrier 4 (thus along the y-direction and transversely to the xz-plane). This
35 position is then fixed by suitable fixing means, see Figure 12.

This takes place already before connecting the complete vehicle door, thus in particular before installing the door module shown in Figure 8 into a corresponding door body. Adjustment is simply carried out using gauges which set the selected reference points of the fixing node 2, 3 on one side and the door frame 10 on the other in relation to each other.

During subsequent installation of a door module into a door body no further adjustment of the window frame 10 is required. In particular a complete tuning of the adjustment of the window frame 10 on one side and window lifter 53 on the other can already be undertaken in advance, particularly in view of the fact that the window pane 8 displaceable by the window lifter 53 is guided properly in the guide channel 14 of the door frame 10.

It is thereby important that the door module illustrated in Figure 8 can be fully checked over outside of the vehicle door since it comprises not only the essential function components of the vehicle door (window lifter and door lock) but also the associated operating elements integrated in the arm rest 50 by which these function components can be controlled.

Figure 9 shows a door body 9 forming a door base part (lower part of the door bodywork) and comprising a door outside panel 91 and a door inside panel 92 which is provided with a large surface cut out section 93, which are connected together inter alia at the side ends 95a, 95b of the door body 9. A reinforcement rib 94 extends transverse over the large surface cut out section 93 of the door inside panel 92. Furthermore a number of protrusions project into the cut out section 93, which have fixing sites in the form of fixing openings 96 to

connect with the assembly carrier 4 through its fixing openings 46 (see Figure 7).

The door body 9 forms a door base part in the form of a door shaft with two side shaft guides 90a, 90b in which the frame structure 1 can be inserted by its fixing nodes 2, 3 (see Figure 8). Sockets 99a, 99b in the region of the front and rear shaft guide 90a, 90b thereby serve to hold corresponding pins of the front and rear fixing nodes and oblong holes 97a, 98a; 97b, 98b in the front and rear shaft guides 90a, 90b serve to adjust the door module relative to the door body inside the door plane (xz-plane, see Figure 10).

Figure 9 also shows an outside mirror A and a mirror holder S in dotted lines; these are however not fixed on the door body 9 but rather on the mirror triangle 29 which is moulded internal on the front fixing nodes 2 (see Figure 4).

Figure 10 shows an assembly step during the assembly of a vehicle door comprising the door module illustrated in Figure 8 and the door body illustrated in Figure 9.

The frame structure 1 of the door module is pushed from above into the shaft guides 90a, 90b of the door body 9 whereby the front shaft guide 90a is associated with the front fixing node 2 and the rear shaft guide 90b is associated with the rear fixing node 3. Lowering the frame structure 1 into the shaft guide 90a, 90b of the door body 9 is concluded when the pins 20a, 30a provided for this purpose on the front and rear fixing nodes 2, 3 lie in the corresponding sockets 99a, 99b of the door body 9.

The frame structure 1 and door body 9 are then connected together initially provisionally. In this state the frame structure 1 is adjusted relative to the door body 9 in the door plane (xz-plane). The oblong holes 97a, 98a as well as 97b, 98b (see also Figure 9) of the front and rear shaft guide 90a, 90b serve for this purpose. These form a reference point system relative to which the fixing holes 23a, 23b and 33a, 33b (see also Figures 4 - 6) provided for this purpose in the front and rear fixing nodes 2, 3 are aligned by means of suitable gauges.

When this adjusting process has been completed the front and rear fixing nodes 2, 3 are fixed in the front and rear shaft guides 90a, 90b respectively by means of fixing screws 102, 103 (see Figures 11 and 12) whereby these fixing screws engage on one side through the oblong holes 97a, 98a; 97b, 98b and on the other through the internally threaded fixing openings 23a, 23b, 33a, 33b.

An adjustment of the window frame 20 relative to the door body 9 across the door plane (thus in the y-direction across the ax plane) is however no longer necessary; for the window frame 10 was already adjusted in this direction relative to the fixing nodes 2, 3 and the assembly carrier. The fixing nodes 2, 3 are therefore inserted into the corresponding shaft guides 90a, 90b without any adjusting play relative to the y-direction.

Furthermore the frame part 27 is fixed onto the door body 9 through an oblong hole 98' in the door inside panel 92 by means of a fixing screw 104 which is associated with an internal thread 27b in the frame part 27 moulded in one piece on the front fixing node 2.

Figures 10 and 11 furthermore show that further fixing screws 101 are provided in order to fix the assembly carrier 4 on the door body 9 through its fixing openings 46 and the associated fixing openings 96 on the door body.

Figure 12 shows a cross section through the vehicle door illustrated in Figures 10 and 11 in the region of the front fixing node 2. This illustration is of interest in particular as regards adjusting the door frame relative to the front fixing node 2 and was already explained in connection with Figures 4 to 6.

Figure 12 can also show that the door outside panel 91 is connected to the door inside panel 92 through a connecting site 91' on the base side in the region of the front side end 95a of the door body 9.

1. Door module for fixing to a door body (9) forming a door base component of a motor vehicle door

5 with

- a frame structure comprising a window frame (10) with guide for a window pane (8)
- an assembly carrier (4) for holding function components of the vehicle door on which at least the structural elements of a window lifter holding the window pane (8) are prefitted, and
- at least one fixing node (2, 3) provided on the frame structure and through which the frame structure can be connected to the door body (9)

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characterised in that

the at least one fixing node (2, 3) has means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) relative to the fixing node (2, 3) and aggregate support (4) substantially transverse to the door plane (xz-plane) in which the aggregate support (4) extends.

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2. Door module according to claim 1 characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) relative to the fixing node (2, 3) substantially transverse to the door plane (xz-plane) are provided on the fixing node (2, 3).

25

PATENT CLAIMS

1. ~~Door module for fixing to a door body (9) forming a~~
door base component of a motor vehicle door
5 with
- a frame structure comprising a window frame (10) with
guide for a window pane (8)
- an assembly carrier (4) for holding functional
10 components of the vehicle door on which at least the
structural elements of a window lifter holding the
window pane (8) are prefitted, and
- at least one fixing node (2, 3) provided on the frame
structure and through which the frame structure can
be connected to the door body (9)

15 characterised in that

the at least one fixing node (2, 3) has means (6, 21, 22,
31, 32) for adjusting the position of the window frame
20 (10) relative to the fixing node (2, 3) substantially
transverse to the door plane (xz-plane) in which the
assembly carrier (4) extends.

2. Door module according to claim 1 characterised in that
25 the means (6, 21, 22, 31, 32) for adjusting the position
of the window frame (10) relative to the fixing node (2,
3) substantially transverse to the door plane (xz-plane)
~~are provided on the fixing node (2, 3).~~

30 3. Door module according to claim 1 or 2 characterised in
that the fixing node (2, 3) is formed by a separate
structural part of the door module (1- 4).

4. Door module according to one of the preceding claims
35 characterised in that the fixing node (2, 3) is mounted in

the region of an upper end section (42) of the assembly carrier (4) facing the window opening.

5 5. Door module according to one of the preceding claims characterised in that the fixing node (2, 3) protrudes in the door plane (xz-plane) laterally from the assembly carrier (4).

10 6. Door module according to one of the preceding claims characterised in that the fixing node (2, 3) is formed like a housing for holding the parts of the window frame (10) as well as the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10).

15 7. Door module according to one of the preceding claims characterised in that the fixing node (2, 3) and the assembly carrier (4) form one structural unit relative to which the position of the window frame (10) can be adjusted.

20 8. Door module according to one of the preceding claims characterised in that the window frame (10) is adjustable substantially transversely to the door plane (xz-plane) both in respect of the assembly carrier (4) and in respect
25 of the door body (9).

9. Door module according to claim 8 characterised in that the window frame (10) is associated with a front and a rear fixing node (2, 3) in relation to the longitudinal
30 axis of the vehicle, wherein preferably each of the two fixing nodes (2, 3) has means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10).

10. Door module according to one of the preceding claims
35 characterised in that the means (6, 21, 22, 31 32) for

adjusting the position of the window frame (10) are provided for swivelling the window frame (10) relative to the fixing node (2, 3).

5 11. Door module according to claim 10 characterised in that the window frame (10) is able to swivel relative to the fixing node (2, 3) about an axis running substantially towards the longitudinal axis (x) of the vehicle.

10 12. Door module according to claim 10 or 11 characterised in that the window frame (10) and the fixing node (2, 3) interact on the ball and socket principle.

13. Door module according to one of the preceding claims
15 characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) comprise a wedge (6) which is mounted between the window frame (10) and fixing node (2, 3).

20 14. Door module according to claim 13 characterised in that the wedge (6) is displaceable in the door plane (xz-plane), more particularly transverse to the longitudinal axis (x) of the vehicle between the fixing node (2, 3) and the window frame (10).

25 15. Door module according to claim 14 characterised in that the wedge (6) is able to swivel in the door plane (xz-plane) between the fixing node (2, 3) and the window frame (10).

30 16. Door module according to one of the preceding claims characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) act independently of the fixing means (63, 64) through which

the window frame (10) is connected to the fixing node (2, 3).

17. Door module according to one of the preceding claims
5 characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) can be locked in a defined position through the fixing means (63, 64).

10 18. Door module according to one of the preceding claims characterised in that the door module (1 - 4) has means (7, 42, 43) for reinforcing the door.

15 19. Door module according to claim 18 characterised in that the means (7, 42) for reinforcing the door are provided in the breast area (B) of the door.

20 20. Door module according to claim 18 or 19 characterised in that the means (7, 42) for reinforcing the door comprise a longitudinally extended reinforcement element (7) which extends in the vehicle longitudinal direction (x) and is connected to the or each fixing node (2, 3).

25 21. Door module according to claim 9 and claim 20 characterised in that the means (7, 42) for reinforcing the door extend between the two fixing nodes (2, 3) and are connected to each of the two fixing nodes (2, 3).

30 22. Door module according to claim 20 or 21 characterised in that the longitudinally extended reinforcement element (7) is formed tubular at least in the region of the or each fixing node (2, 3).

35 23. Door module according to one of claims 20 to 22 characterised in that the longitudinally extended

reinforcement element (7) is supported on the or each fixing node (2, 3).

24. Door module according to one of claims 20 to 23 characterised in that the longitudinally extended reinforcement element (7) is connected with keyed engagement to the or each fixing node (2, 3).

25. Door module according to claim 24 characterised in that the keyed connection is formed by a plug fit connection.

26. Door module according to one of claims 20 to 25 characterised in that the longitudinally extended reinforcement element (7) is additionally connected to the assembly carrier (4), more particularly through a material-bonding connection.

27. Door module according to one of claims 20 to 26 characterised in that the assembly carrier (4) is strengthened and/or profiled in the region of the longitudinally extended reinforcement element (7).

28. Door module according to one of the preceding claims characterised in that function components (51 - 54) of the vehicle door are prefitted on the assembly carrier (4).

29. Door module according to one of the preceding claims characterised in that at least one fixing node (2, 3) has means (23a, 23b, 33a, 33b) for adjusting the position of the fixing node relative to the door body (9) in the vehicle longitudinal direction (x) and/or transverse to the door plane (xz-plane), and these means can interact with corresponding means (97a, 97b, 98a, 98b) of the door body (9).

30. Motor vehicle door having a door body (9) forming a base component of the door and having a door module (1 - 4) according to one of the preceding claims which can be
5 connected to the door body (9).

31. Motor vehicle door according to claim 30 characterised in that the door module (1 - 4) can be pushed by at least one section (12, 27) of its frame
10 structure (1) into the door body (9).

32. Motor vehicle door according to claim 30 or 31 characterised in that the position of the door module (1 - 4) can be adjusted relative to the door body (9) in the
15 vehicle longitudinal direction (x) and/or transverse to the door plane (xz-plane).

33. Motor vehicle door according to claim 32 characterised in that in order to adjust the position of the door module (1 - 4) relative to the door body (9) at
20 least one bolt (102, 103) is provided which is associated with an oblong hole (97a, 97b, 98a, 98b) which extends along the relevant adjusting direction.

34. Motor vehicle door according to claim 32 or 33 characterised in that in order to adjust the position of the door module (1 - 4) the position of the at least one fixing node (2, 3) is adjustable relative to the door body
25 (9).

35. ~~Motor vehicle door according to one of claims 30 to 34 characterised in that the door module (1 - 4) can be connected to the door body (9) substantially without any adjustment play perpendicular to the door plane (xz-plane).~~
35

35. Motor vehicle door according to one of claims 30 to 34 characterised in that the door module (1 - 4) can be
5 connected to the door body (9) substantially without any adjustment play perpendicular to the door plane (xz-plane).

36. Method for assembling a vehicle door according to one
10 of claims 30 to 35 which comprises a door body (9) forming a base component of the door, as well as a door module (1 - 4), wherein the door module (1 - 4) has the following:

- a frame structure which comprises a window frame (10) with a guide for a window pane (8)
- 15 - an aggregate support (4) for holding function components of the vehicle door, on which at least the structural elements of a window lifter holding the window pane (8) are prefitted, and
- at least one fixing node (2, 3) provided on the frame
20 structure and through which the frame structure can be connected to the door body (9)

characterised in that

25 prior to connecting the door module (1 - 4) to the door body (9) the position of the window frame (10) is adjusted relative to the fixing node (2, 3) and the aggregate support substantially transverse to the door plane (xz-plane) in which the aggregate support (4) extends.

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36. ~~Method for assembling a vehicle door according to one~~
of claims 30 to 35 which comprises a door body (9) forming
a base component of the door, as well as a door module (1
5 - 4), wherein the door module (1 - 4) has the following:

- a frame structure which comprises a window frame (10)
with a guide for a window pane (8)
- an assembly carrier (4) for holding function
10 components of the vehicle door, on which at least the
structural elements of a window lifter holding the
window pane (8) are prefitted, and
- at least one fixing node (2, 3) provided on the frame
structure and through which the frame structure can
be connected to the door body (9)

15 characterised in that prior to connecting the door module
(1 - 4) to the door body (9) the position of the window
frame (10) is adjusted relative to the fixing node (2, 3)
substantially transverse to the door plane (xz-plane) in
~~which the assembly carrier (4) extends.~~

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37. Method according to claim 36 characterised in that
adjusting the position of the window frame (10) is carried
out by swivelling the window frame (10) about an axis (x-
axis) lying in the door plane (xz-plane).

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38. Method according to claim 36 or 37 characterised in
that when fitting together the door module (1 - 4) and
door body (9) the position of the door module (1 - 4)
relative to the door body (9) is adjusted solely in the
30 door plane (xz-plane).

39. Method according to one of claims 36 to 39
characterised in that when assembling and adjusting the
individual door elements (1 - 4, 9, 10) gauges are used by

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means of which reference points of the individual door elements (1 - 4, 9, 10) are set in relation to each other.

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DOOR MODULE FOR FIXING TO A DOOR BODY FORMING A BASE
COMPONENT OF A MOTOR VEHICLE DOOR AND METHOD FOR
ASSEMBLING A DOOR MODULE OF THIS KIND

5 Description

The invention relates to a door module for fixing on a door body forming a base component of a motor vehicle door according to the preamble of patent claim 1 as well as to
10 a method for assembling a door module of this kind.

A door module of the generic kind comprises a frame structure having a window frame, a flat surface assembly carrier for holding function components of the vehicle
15 door, on which at least the structural elements of the lift mechanism of a window lifter holding a window pane are pre-fitted, and one or more fixing nodes provided on the frame structure, where these fixing nodes are fixing sites provided on the frame structure through which the
20 frame structure can be connected to the door body.

By door body is meant here in particular a base component of a door having an outside door panel and an inside door panel which has a large-surface cut-out section which can
25 be covered by the assembly carrier, or a holder for the assembly carrier which is connected to the outside panel of the door and extends towards the inside space of the vehicle, with the base component forming together with the door frame and assembly carrier the essential supporting
30 door components on which the additional function components of the vehicle door are fixed.

By structural components of a window lifter holding the window pane are meant those structural components of the window lifter which support the window pane and thereby fix its position in the vehicle door, thus in the case of
5 a cable window lifter in particular the guide rail and the follower guided on the guide rail and in the case of an arm window lifter, more particularly the at least one lever arm and the associated window pane socket.

10 A door module of the kind already described is known from German patent specification 997 009.

In US PS 5 927 021 a vehicle door is described which consists of a door body and a door frame with assembly
15 carrier fixable on the door body. The door frame and assembly carrier are hereby combined into one structural unit and together are connected with swivel movement to the door body through adjusting means. The adjusting means which are provided for adjusting the door frame
20 together with the assembly carrier relative to the body are thereby mounted on the door body.

From EP 0 405 159 A1 a vehicle door is known having a door body in which the door frame is integrated as a
25 constituent part and on which an assembly carrier can be fixed in the form of two rails. There is no possibility for adjusting the door frame relative to the door body.

The object of the invention is therefore to improve the
30 known door module so that the assembly of the vehicle door is facilitated, particularly with regard to adjusting the position of the different door components relative to each other.

This is achieved according to the invention by providing a door module having the features of patent claim 1.

According to this the door module has on the or each
5 fastening node means for adjusting the position of the window frame relative to the fixing node substantially transversely to the plane (door plane) in which the assembly carrier extends, i.e. the window frame is adjustable so that the adjusting movement has a component
10 across the door plane.

The phrase "substantially across the door plane" is to refer to the fact that the plane defined by a vehicle door or its assembly carrier has as a rule curvatures and
15 moulded areas so that the definition of a door plane can always only be approximate.

The solution according to the invention has the advantage that when fitting together the door module a precise
20 alignment of the window frame is possible relative to the or each fixing node transversely to the door plane (in which in particular the assembly carrier lies) so that the alignment of the window frame can be adapted precisely to the requirements demanded by the construction of the door
25 body.

Preferably the means for adjusting the position of the window frame relative to the fixing node are provided solely on the or each fixing node.

30 The fixing node can be formed by a separate component part of the door module which can be fixedly connected to the assembly carrier and which holds the window frame adjustable.

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In a preferred embodiment of the invention the fixing node is mounted in the region of the upper end section of the assembly carrier facing the window opening whereby it protrudes at the same time in the door plane (xz-plane) laterally from the assembly carrier.

The fixing node is formed like a housing to hold parts of the window frame as well as means for adjusting the position of the window frame.

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The or each fixing node and the assembly carrier preferably form one pre-mountable structural unit, in respect of which the window frame can be adjusted across the extension plane of the assembly carrier. For this

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purpose the or each fixing node and the assembly carrier are connected together in suitable manner.

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During later assembly of the door module with the door body by connecting the fixing node to the door body it is then only necessary to adjust the door module relative to the door body within the door plane (extension plane of the assembly carrier). The connection between the door module and door body can take place across the door plane without any adjusting play. The or each fixing node can

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have for this purpose an assembly pin which can be inserted into a corresponding socket of the door body and thereby enables a substantially play-free fixing of the relevant fixing node on the door body transverse to the door plane.

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Through the said measures it becomes possible for the window frame to be adjusted (by swivelling) both relative to the door body and to the assembly carrier transverse to the door plane whereby the adjustment of the window frame is undertaken directly relative to the fixing node, and

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- 5 -

the door body as well as the assembly carrier are fixed relative to the fixing node without any adjusting play perpendicular to the door plane.

- 5 If the door module has two fixing nodes then these are arranged one behind the other relative to the longitudinal direction of the vehicle so that - in relation to the front vehicle door - the one fixing node is associated with the A-pillar of the vehicle and the other fixing node
- 10 with the B-pillar of the vehicle. Each of the two fixing nodes can hereby have means for adjusting the position of the window frame or these means are associated with only one of the fixing nodes, and in the region of the other fixing node the adjustment of the window frame is only
- 15 completed passively.

Adjusting the position of the window frame across the door plane takes place in particular by swivelling the window frame about a swivel axis running substantially parallel

20 to the longitudinal axis of the vehicle. To this end the window frame and the relevant fixing node preferably interact on the ball and socket principle, and a wedge is provided which with one wedge face bears against the fixing node and with an other wedge face bears against the

25 window frame and can be displaced between the fixing node and the window frame in order to trigger swivel movement of the window frame relative to the fixing node. Instead of a displaceable wedge, a wedge can also be provided which can swivel in the door plane.

- 30 Swivelling the window frame is a special case of those particularly preferred adjusting movements where the component of the adjusting movement across the door plane is greater than the component lying in the door plane,
- 35 thus form the main components of the adjusting movement.

The means for adjusting the position of the window frame should act independently of the fixing means through which the window frame is connected to the relevant fixing node. This means that the means for adjusting the position of the window frame relative to the fixing node are separate adjusting means which after first pre-fitting the window frame on the fixing node enable a deliberate adjustment of the position of the window frame relative to the fixing node. Only then can the final fixing of the window frame on the fixing node take place whereby the fixing means used for this preferably at the same time lock the previously set position of the window frame.

In a preferred embodiment of the invention the door module has additionally means for reinforcing the door, which are provided in the breast area of the door without any such means extending in the longitudinal direction of the vehicle.

The means for reinforcing the door preferably comprise a longitudinally extended reinforcement element which runs in the longitudinal direction of the vehicle between two fixing nodes and is fixed on same.

In order to enable a keyed connection between the longitudinally extended reinforcement and the fixing node the longitudinally extended reinforcement element is formed tubular at least in the region of the fixing node and can be fitted onto corresponding pins of the fixing node in the manner of a plug-fit connection. The longitudinally extended reinforcement element is hereby supported on the fixing node at the same time.

Alternatively obviously a tubular section can be provided on the fixing node and is associated with a corresponding pin of the longitudinally extended reinforcement element.

- 5 In a preferred further development the longitudinally extended reinforcement element is additionally connected to the assembly carrier, more particularly by welding, and the assembly carrier has in the region of the longitudinally extended reinforcement element a material
- 10 strengthening and/or a longitudinally extended profiled shape wherein the latter can surround at least in part the reinforcement element. The reinforcement of the vehicle door in the breast area is hereby optimized.
- 15 Apart from the window lifter further function components of the vehicle door can also be pre-fitted on the assembly carrier.

- In a vehicle door which consists of a door body forming a
- 20 door base part and of a door module according to one of the preceding claims, the door module on the one hand and the door body on the other are preferably formed so that the door module can be pushed with at least one section of its frame structure into the door body. To this end the
- 25 door body has a corresponding socket shaft.

- After inserting the door module into the door body it is still possible to adjust the position of the door module relative to the door body in the door plane. To this end
- 30 bolts can be provided which are associated with corresponding oblong holes extending along the relevant adjustment direction.

- A method for assembling a vehicle door which consists of a
- 35 door body forming a door base part, and a door module

according to the invention is characterised by the features of claim 31.

According to this when assembling the vehicle door first
5 the position of the window frame is adjusted relative to
the or each fixing node transverse to the door plane
(extension plane of the assembly carrier) and then the
door module is connected to the door body. After
connecting the door module to the door body it is possible
10 to carry out an adjustment of these two structural groups
relative to each other inside the door plane.

The adjustment and assembly preferably take place by means
of gauges which set the relevant reference points in
15 relation to each other.

Further advantages of the invention will now be apparent
from the following description of an embodiment
illustrated in the drawings in which:

- 20 Figure 1 shows a perspective view of a window frame
associated with a front and rear fixing
node;
- 25 Figure 2 shows a window frame according to Figure 1,
with a window pane seal also shown;
- Figure 3 shows a section of Figure 2;
- 30 Figure 4 shows a detailed view of the front fixing
node;
- Figures 5/6 show details of the rear fixing node in two
different perspective views;

Figure 7 shows a perspective view of an assembly carrier on which different function elements of the vehicle door are pre-fitted and which has a reinforcement in the breast area;

Figure 8 shows a door module consisting of a window frame according to Figures 1 to 3, fixing nodes according to Figures 4 to 6 and the assembly carrier according to Figure 7 in the pre-assembled state;

Figure 9 shows a door body which is suitable for holding the door module of Figure 8;

Figure 10 shows an assembly stage during the assembly of the door module and door body;

Figure 11 shows the door module and door body in the assembled state;

Figure 12 shows a section through the illustration according to Figure 11.

Figure 1 shows a frame structure of a vehicle door having a window frame 10 which has a front side frame part 10 and a rear side frame part 11 which are connected together through an upper frame part 13 wherein the window frame has a guide channel 15 for a window pane.

The front frame part 11 is fixed on a front fixing node 2 on which an additional frame section 27 is moulded in one piece. A rear fixing node 3 is associated with the rear frame part 12 in similar manner.

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Figure 2 shows additionally a window pane seal 16 which is inserted in the guide channel 15 of the window frame 10.

Figure 3 shows a cross-section through the rear frame part 12 from which it can be seen that the window frame 10 is formed by an aluminium profile 14 of H-shaped cross-section preferably made by the stretch/bending process and having a guide channel 15 in which the pane seal 16 is inserted. The pane seal 16 is substantially U-shaped and holds a window pane 8 between its two arms.

Figure 4 shows the front fixing node 2 (on the A-pillar side) in detail. This fixing node 2 is an aluminium pressure cast component having a base body 20 on which are formed integral a frame section 27, a mirror triangle 29 and a projection 25 for holding an assembly carrier and breast reinforcement.

The base body 20 of the front fixing node 2 holds the front frame part 11 of the window frame in a guide provided specially for same. Between an inner surface 21 of the fixing node and the front frame part 11 is a wedge 6 whose inclined wedge faces converge upwards into a point and which adjoins by one wedge face against the inner surface 21 of the fixing node and by its other wedge face against the front frame part 11.

Since the base body 20 of the front fixing node 2 has on its inner surface 21 facing the front frame part 11 a convex protrusion 22 against which the front frame part 11 bears, the front frame part 11 and the base body 20 of the front fixing node 2 interact in the region of this

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protrusion 22 (above the wedge 6) on the ball and socket principle. Moving the wedge 6 upwards therefore leads to a swivel movement of the front frame part 11 and thus of the entire window frame about this protrusion 22, see for this also the cross-section through the front fixing node 2 in the A-pillar side region of a vehicle door according to Figure 12. This swivel movement is due to the fact that displacement of the tapering wedge 6 upwards (towards the protrusion 22) in the region below the protrusion 22 causes displacement of the window frame 11 outwards (towards the door outside panel 91 according to Figure 12). This leads above the protrusion 22 to a movement of the window frame 11 in the opposite direction, thus towards the inside of the vehicle. Overall it results in a swivel movement of the window frame 11 about the protrusion 22 of the inner face 21 of the fixing node 2. This is synonymous with a swivel movement of the front frame part 11 and thus of the complete window frame about the longitudinal axis of the vehicle (x-axis, see Figure 10) through which the frame part 11 can swivel out of the door plane (xz-plane).

From Figure 4 it can further be seen that the base body 20 of the front fixing node 2 has in the region of the protrusion 22 a fixing opening 23c. This enables the window frame 11 to be fixed on the base body 20 of the fixing node 2 in the region of the protrusion 22 by means of a suitable fixing bolt 63, see Figure 12. It is also apparent that an additional fixing between the base part 20 and the front frame part 11 takes place in the region of the wedge 6 by means of a further fixing bolt 64 (for which the wedge has a corresponding oblong hole). Through the two fixing bolts 63, 64 it is possible to fix any adjustment of the door frame 11 relative to the front fixing node 2 which had previously been undertaken by displacing the wedge 6.

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According to Figure 4 the base body 20 of the front fixing node 2 furthermore has a fixing opening 23d which serves for fixing on a door body by means of a fixing screw 103, see Figures 11 and 12.

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From the base body 20 of the front fixing node 2 protrudes a projection 25 which is aligned in the longitudinal direction of the vehicle (x-direction, see Figure 10) and which has two fixing openings 24 for fixing the profiled upper section 42 of an assembly carrier as well as a pin 26 for holding a tubular reinforcement element 7. The profiled section 42 of an assembly carrier bears directly on the projection 25 of the front fixing node 2 and is additionally supported in the longitudinal direction on a support face 25a of the base body 20 of the fixing node 2. The fixing tube 7 is pushed onto the pin 26 and by its inner face 71 of its outer wall 17 bears against this pin. It is additionally supported in the longitudinal direction of the vehicle against a stop face 25b of the projection 25.

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The upper section 42 of the assembly carrier 4 additionally defines at the same time the bottom of the window opening in the door module formed by the frame 10 (see Figures 1, 2, and 8). This window opening is defined through the frame parts 11 - 13 of the window frame 10 as well as through the upper section 42 of the assembly carrier 44 which is provided with a reinforcement element 7.

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At the bottom a frame section 27 is moulded on the base body 20 of the fixing node 2 and has reinforcement ribs 27a, a fixing spot in the form of a fixing opening 27b for fixing on a door body as well as a window pane guide 28. The window pane guide 28 in the form of a guide channel continues upwards up to a mirror triangle 29 moulded on

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the upper side of the base body 22 and on which an outside mirror can be fixed.

Figures 5 and 6 show in two perspective illustrations the rear fixing node 3 (thus the node on the B-pillar side in the case of a front door), which is formed as an aluminium pressure cast component.

The rear fixing node 3 comprises a base body 30 on which a projection 35 is moulded to hold an assembly carrier as well as a tubular reinforcement element. The projection 35 has two fixing spots in the form of fixing openings 34 through which the upper section of an assembly carrier can be fixed on the rear fixing node 3 wherein the assembly carrier can be supported additionally in the longitudinal direction of the vehicle on a stop face 35a of the base body 30 of the rear fixing node 3. Furthermore on the projection 35 there is also a moulded pin 36 extending in the longitudinal direction of the vehicle (x-direction, see Figure 10) and on which a tubular reinforcement element can be pushed whereby this tubular reinforcement element is additionally associated with a stop face 35b on the projection 35 on which it can be supported in the longitudinal direction of the vehicle.

The base body 30 of the rear fixing node 3 has a guide for holding the rear frame part 12 wherein a wedge 6 is inserted between an inner surface 31 of the base body 30 facing the rear frame part 12, and the inner frame part 12, with the two wedge faces converging upwards to a point.

Furthermore the base body 30 of the rear fixing node 3 has on its inner surface 31 facing the frame part 12 a convex shaped protrusion 32 on which the fixing node 3 and the rear frame part 12 interact according to the ball and

socket principle. In the same way as in the front fixing node therefore by sliding the wedge 6 up or down it is possible to achieve a swivel movement of the rear frame part 12 about the longitudinal axis of the vehicle. The upper section of the rear frame part 12 is thereby swivelled towards the inside of the vehicle when the wedge 6 is moved upwards whilst sliding the wedge 6 downwards causes the opposite swivel movement of the frame part 12.

- 10 The base body 30 of the rear fixing node 32 has according to Figures 5 and 6 two fixing openings in the form of threaded holes 33b, 33c of which one is provided in the region of the wedge 6 and the other in the region of the convex protrusion 32. It is thereby clear from Figure 6
- 15 that the wedge 6 is provided with an oblong hole 5a which interacts with the associated fixing opening 33b and also allows after a longitudinal displacement of the wedge 6 the passage of a suitable fixing member on the one side through the fixing opening 33b and on the other through
- 20 the wedge 6. A corresponding oblong hole is also provided in the case of the wedge associated with the front fixing node 2, even though it cannot be seen in Figure 4. Thus by means of suitable fixing bolts it is possible to fix the rear frame part 12 and the rear fixing node 3 against
- 25 each other whereby the adjustment of the frame 12 relative to the fixing node 3 undertaken previously by means of sliding the wedge 6 is now fixed.

- Figures 5 and 6 also show a pin 30a of the base body 30 of the fixing node 3 as well as two further fixing openings 33a, 33d. The pin 30a serves for fitting into a corresponding socket of a door body so that the fixing

node 3 is supported there through the pin 30a. The fixing openings 33a, 33d serve to connect the rear fixing node 3 with the door body, see Figures 11 and 12.

5 Figure 7 shows an assembly carrier on which a number of function components of a vehicle door are prefitted and which can be assembled together with the frame structure 1 shown in Figure 1 into one door module.

10 The assembly carrier consists of a support plate 40 having a recess 41 as well as a profiled upper section 42 which is associated with the breast area of the vehicle door, see Figure 10.

15 The profiled section 42 of the assembly carrier 4 has a material reinforcement compared to the support plate 40 wherein the reinforced material section is connected by means of laser welding to the remaining part of the assembly carrier 4. The profiled section 42 of the
20 assembly carrier 4 furthermore comprises a longitudinally extending reinforcement element in the form of a tube 7 which extends along the vehicle longitudinal axis (x-axis, see Figure 10). This is likewise connected to the profiled section 42 of the assembly carrier 4 through
25 laser welding.

As a result of the stiffening of the assembly carrier 4 in the breast area of the door through profiling the corresponding section 42 of the assembly carrier, by using
30 a material having a greater material thickness compared with the support plate 40 as well as by additionally fitting a longitudinally extending reinforcement element in the form of a tube 7, the assembly carrier 4 is strengthened considerably both in respect of pressure
35 forces (which occur in the event of a front impact crash) and bending forces (following a side impact crash). Thus

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important elements are already integrated in the assembly carrier 4 here to secure and strengthen the door against a front or side impact crash; therefore no such reinforcement element need be provided in the door body itself, see Figure 9.

The assembly carrier 4 furthermore has a diagonal reinforcement element 43 which extends over the cut-out section 41 of the support plate 40, as well as a number of fixing sites in the form of fixing openings 46 for connection with a door body, see Figures 10 and 11.

The support plate 40 of the assembly carrier 4 serves to hold a number of function components of the vehicle door which are prefitted on the support plate 40. Thus an arm rest 51 is fixed directly on the support plate 40 and has a grab handle 51a, a door inside opener 51b as well as a number of operating elements 51d wherein the operating elements 51d serve to operate different electrical function elements of the vehicle, e.g. an electric door lock, a window lifter etc. Furthermore the support plate 40 supports an electric door lock 52 which can be locked through one of the operating elements of the operating zone 51d of the arm rest 50 and which is furthermore in active connection with the door inside opener 51b through a coupling element 51c.

Furthermore a window lifter 53 is prefitted on the support plate 40 and comprises an electrical drive unit 53a, a draw member in the form of a cable 53b movable by means of the drive unit 53a, a guide rail 53c as well as a follower 53d which is guided on the guide rail 53c and is movable by means of the draw member 53b. This follower 53d supports the window pane 8 and thus serves to connect the window pane 8 to the window lifter 53. Finally a speaker 54 of an audio unit is fixed on the support plate 40.

Figure 8 shows the door module according to the invention in the assembled state according to which the assembly carrier 4 has been connected to the frame structure 1. Fixing screws 49 are thereby used for fixing which engages on one side through the oblong holes 48 in the upper profiled section 42 of the assembly carrier 4 (see Figure 7) as well as on the other side through the internally threaded fixing openings 24, 34 in the projections 25, 35 of the front and rear fixing node 2, 3 (see Figures 4 - 6).

From Figure 8 it is apparent that the longitudinally extended profiled upper section 42 of the assembly carrier 4 as well as the longitudinally extended reinforcement element in the form of a tube 7 extend in the breast area B of the door module.

In the state of the door module 4 shown in Figure 8 in which the frame structure 1 and the assembly carrier are connected (initially provisionally), the window frame 7 can be adjusted relative to the fixing nodes 2, 3 and thus also relative to the assembly carrier 4 transverse to the extension plane of the assembly carrier 4 (thus the xz-plane). As already explained in respect of Figures 4 to 6 and 12 this adjustment is undertaken in that inside the front or rear fixing node 2, 3 corresponding wedges are moved up or down along the z-axis which results in a swivel movement of the window frame 10 about an axis (vehicle longitudinal axis) running along the vehicle longitudinal direction (x-direction). The position of the window frame 10 is thus adjusted across the extension plane of the assembly carrier 4 (thus along the y-direction and transversely to the xz-plane). This position is then fixed by suitable fixing means, see Figure 12.

This takes place already before connecting the complete vehicle door, thus in particular before installing the door module shown in Figure 8 into a corresponding door body. Adjustment is simply carried out using gauges which set the selected reference points of the fixing node 2, 3 on one side and the door frame 10 on the other in relation to each other.

10 During subsequent installation of a door module into a door body no further adjustment of the window frame 10 is required. In particular a complete tuning of the adjustment of the window frame 10 on one side and window lifter 53 on the other can already be undertaken in advance, particularly in view of the fact that the window pane 8 displaceable by the window lifter 53 is guided properly in the guide channel 14 of the door frame 10.

It is thereby important that the door module illustrated in Figure 8 can be fully checked over outside of the vehicle door since it comprises not only the essential function components of the vehicle door (window lifter and door lock) but also the associated operating elements integrated in the arm rest 50 by which these function components can be controlled.

Figure 9 shows a door body 9 forming a door base part (lower part of the door bodywork) and comprising a door outside panel 91 and a door inside panel 92 which is provided with a large surface cut out section 93, which are connected together inter alia at the side ends 95a, 95b of the door body 9. A reinforcement rib 94 extends transverse over the large surface cut out section 93 of the door inside panel 92. Furthermore a number of protrusions project into the cut out section 93, which have fixing sites in the form of fixing openings 96 to

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connect with the assembly carrier 4 through its fixing openings 46 (see Figure 7).

5 The door body 9 forms a door base part in the form of a door shaft with two side shaft guides 90a, 90b in which the frame structure 1 can be inserted by its fixing nodes 2, 3 (see Figure 8). Sockets 99a, 99b in the region of the front and rear shaft guide 90a, 90b thereby serve to hold corresponding pins of the front and rear fixing nodes
10 and oblong holes 97a, 98a; 97b, 98b in the front and rear shaft guides 90a, 90b serve to adjust the door module relative to the door body inside the door plane (xz-plane, see Figure 10).

15 Figure 9 also shows an outside mirror A and a mirror holder S in dotted lines; these are however not fixed on the door body 9 but rather on the mirror triangle 29 which is moulded internal on the front fixing nodes 2 (see Figure 4).

20 Figure 10 shows an assembly step during the assembly of a vehicle door comprising the door module illustrated in Figure 8 and the door body illustrated in Figure 9.

25 The frame structure 1 of the door module is pushed from above into the shaft guides 90a, 90b of the door body 9 whereby the front shaft guide 90a is associated with the front fixing node 2 and the rear shaft guide 90b is associated with the rear fixing node 3. Lowering the
30 frame structure 1 into the shaft guide 90a, 90b of the door body 9 is concluded when the pins 20a, 30a provided for this purpose on the front and rear fixing nodes 2, 3 lie in the corresponding sockets 99a, 99b of the door body 9.

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- 20 -

The frame structure 1 and door body 9 are then connected together initially provisionally. In this state the frame structure 1 is adjusted relative to the door body 9 in the door plane (xz-plane). The oblong holes 97a, 98a as well as 97b, 98b (see also Figure 9) of the front and rear shaft guide 90a, 90b serve for this purpose. These form a reference point system relative to which the fixing holes 23a, 23b and 33a, 33b (see also Figures 4 - 6) provided for this purpose in the front and rear fixing nodes 2, 3 are aligned by means of suitable gauges.

When this adjusting process has been completed the front and rear fixing nodes 2, 3 are fixed in the front and rear shaft guides 90a, 90b respectively by means of fixing screws 102, 103 (see Figures 11 and 12) whereby these fixing screws engage on one side through the oblong holes 97a, 98a; 97b, 98b and on the other through the internally threaded fixing openings 23a, 23b, 33a, 33b.

An adjustment of the window frame 20 relative to the door body 9 across the door plane (thus in the y-direction across the ax plane) is however no longer necessary; for the window frame 10 was already adjusted in this direction relative to the fixing nodes 2, 3 and the assembly carrier. The fixing nodes 2, 3 are therefore inserted into the corresponding shaft guides 90a, 90b without any adjusting play relative to the y-direction.

Furthermore the frame part 27 is fixed onto the door body 9 through an oblong hole 98' in the door inside panel 92 by means of a fixing screw 104 which is associated with an internal thread 27b in the frame part 27 moulded in one piece on the front fixing node 2.

Figures 10 and 11 furthermore show that further fixing screws 101 are provided in order to fix the assembly carrier 4 on the door body 9 through its fixing openings 46 and the associated fixing openings 96 on the door body.

Figure 12 shows a cross section through the vehicle door illustrated in Figures 10 and 11 in the region of the front fixing node 2. This illustration is of interest in particular as regards adjusting the door frame relative to the front fixing node 2 and was already explained in connection with Figures 4 to 6.

Figure 12 can also show that the door outside panel 91 is connected to the door inside panel 92 through a connecting site 91' on the base side in the region of the front side end 95a of the door body 9.

PATENT CLAIMS

1. Door module for fixing to a door body (9) forming a door base component of a motor vehicle door

5 with

- a frame structure comprising a window frame (10) with guide for a window pane (8)
- an assembly carrier (4) for holding functional components of the vehicle door on which at least the structural elements of a window lifter holding the window pane (8) are prefitted, and
- at least one fixing node (2, 3) provided on the frame structure and through which the frame structure can be connected to the door body (9)

15

characterised in that

the at least one fixing node (2, 3) has means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) relative to the fixing node (2, 3) substantially transverse to the door plane (xz-plane) in which the assembly carrier (4) extends.

2. Door module according to claim 1 characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) relative to the fixing node (2, 3) substantially transverse to the door plane (xz-plane) are provided on the fixing node (2, 3).

3. Door module according to claim 1 or 2 characterised in that the fixing node (2, 3) is formed by a separate structural part of the door module (1- 4).

4. Door module according to one of the preceding claims characterised in that the fixing node (2, 3) is mounted in

the region of an upper end section (42) of the assembly carrier (4) facing the window opening.

5. Door module according to one of the preceding claims characterised in that the fixing node (2, 3) protrudes in the door plane (xz-plane) laterally from the assembly carrier (4).

6. Door module according to one of the preceding claims characterised in that the fixing node (2, 3) is formed like a housing for holding the parts of the window frame (10) as well as the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10).

7. Door module according to one of the preceding claims characterised in that the fixing node (2, 3) and the assembly carrier (4) form one structural unit relative to which the position of the window frame (10) can be adjusted.

8. Door module according to one of the preceding claims characterised in that the window frame (10) is adjustable substantially transversely to the door plane (xz-plane) both in respect of the assembly carrier (4) and in respect of the door body (9).

9. Door module according to claim 8 characterised in that the window frame (10) is associated with a front and a rear fixing node (2, 3) in relation to the longitudinal axis of the vehicle, wherein preferably each of the two fixing nodes (2, 3) has means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10).

10. Door module according to one of the preceding claims characterised in that the means (6, 21, 22, 31, 32) for

adjusting the position of the window frame (10) are provided for swivelling the window frame (10) relative to the fixing node (2, 3).

5 11. Door module according to claim 10 characterised in that the window frame (10) is able to swivel relative to the fixing node (2, 3) about an axis running substantially towards the longitudinal axis (x) of the vehicle.

10 12. Door module according to claim 10 or 11 characterised in that the window frame (10) and the fixing node (2, 3) interact on the ball and socket principle.

13. Door module according to one of the preceding claims
15 characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) comprise a wedge (6) which is mounted between the window frame (10) and fixing node (2, 3).

20 14. Door module according to claim 13 characterised in that the wedge (6) is displaceable in the door plane (xz-plane), more particularly transverse to the longitudinal axis (x) of the vehicle between the fixing node (2, 3) and the window frame (10).

25 15. Door module according to claim 14 characterised in that the wedge (6) is able to swivel in the door plane (xz-plane) between the fixing node (2, 3) and the window frame (10).

30 16. Door module according to one of the preceding claims characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) act independently of the fixing means (63, 64) through which

the window frame (10) is connected to the fixing node (2, 3).

17. Door module according to one of the preceding claims
5 characterised in that the means (6, 21, 22, 31, 32) for adjusting the position of the window frame (10) can be locked in a defined position through the fixing means (63, 64).

10 18. Door module according to one of the preceding claims characterised in that the door module (1 - 4) has means (7, 42, 43) for reinforcing the door.

19. Door module according to claim 18 characterised in
15 that the means (7, 42) for reinforcing the door are provided in the breast area (B) of the door.

20. Door module according to claim 18 or 19 characterised
20 in that the means (7, 42) for reinforcing the door comprise a longitudinally extended reinforcement element (7) which extends in the vehicle longitudinal direction (x) and is connected to the or each fixing node (2, 3).

21. Door module according to claim 9 and claim 20
25 characterised in that the means (7, 42) for reinforcing the door extend between the two fixing nodes (2, 3) and are connected to each of the two fixing nodes (2, 3).

22. Door module according to claim 20 or 21 characterised
30 in that the longitudinally extended reinforcement element (7) is formed tubular at least in the region of the or each fixing node (2, 3).

23. Door module according to one of claims 20 to 22
35 characterised in that the longitudinally extended

reinforcement element (7) is supported on the or each fixing node (2, 3).

24. Door module according to one of claims 20 to 23
5 characterised in that the longitudinally extended reinforcement element (7) is connected with keyed engagement to the or each fixing node (2, 3).

25. Door module according to claim 24 characterised in
10 that the keyed connection is formed by a plug fit connection.

26. Door module according to one of claims 20 to 25
15 characterised in that the longitudinally extended reinforcement element (7) is additionally connected to the assembly carrier (4), more particularly through a material-bonding connection.

27. Door module according to one of claims 20 to 26
20 characterised in that the assembly carrier (4) is strengthened and/or profiled in the region of the longitudinally extended reinforcement element (7).

28. Door module according to one of the preceding claims
25 characterised in that function components (51 - 54) of the vehicle door are prefitted on the assembly carrier (4).

29. Door module according to one of the preceding claims
30 characterised in that at least one fixing node (2, 3) has means (23a, 23b, 33a, 33b) for adjusting the position of the fixing node relative to the door body (9) in the vehicle longitudinal direction (x) and/or transverse to the door plane (xz-plane), and these means can interact with corresponding means (97a, 97b, 98a, 98b) of the door
35 body (9).

30. Motor vehicle door having a door body (9) forming a base component of the door and having a door module (1 - 4) according to one of the preceding claims which can be
5 connected to the door body (9).

31. Motor vehicle door according to claim 30 characterised in that the door module (1 - 4) can be pushed by at least one section (12, 27) of its frame
10 structure (1) into the door body (9).

32. Motor vehicle door according to claim 30 or 31 characterised in that the position of the door module (1 - 4) can be adjusted relative to the door body (9) in the
15 vehicle longitudinal direction (x) and/or transverse to the door plane (xz-plane).

33. Motor vehicle door according to claim 32 characterised in that in order to adjust the position of the door module (1 - 4) relative to the door body (9) at
20 least one bolt (102, 103) is provided which is associated with an oblong hole (97a, 97b, 98a, 98b) which extends along the relevant adjusting direction.

34. Motor vehicle door according to claim 32 or 33 characterised in that in order to adjust the position of the door module (1 - 4) the position of the at least one fixing node (2, 3) is adjustable relative to the door body
25 (9).

35. Motor vehicle door according to one of claims 30 to 34 characterised in that the door module (1 - 4) can be connected to the door body (9) substantially without any adjustment play perpendicular to the door plane (xz-
35 plane).

36. Method for assembling a vehicle door according to one of claims 30 to 35 which comprises a door body (9) forming a base component of the door, as well as a door module (1 - 4), wherein the door module (1 - 4) has the following:

- a frame structure which comprises a window frame (10) with a guide for a window pane (8)
- an assembly carrier (4) for holding function components of the vehicle door, on which at least the structural elements of a window lifter holding the window pane (8) are prefitted, and
- at least one fixing node (2, 3) provided on the frame structure and through which the frame structure can be connected to the door body (9)

15 characterised in that prior to connecting the door module (1 - 4) to the door body (9) the position of the window frame (10) is adjusted relative to the fixing node (2, 3) substantially transverse to the door plane (xz-plane) in which the assembly carrier (4) extends.

20

37. Method according to claim 36 characterised in that adjusting the position of the window frame (10) is carried out by swivelling the window frame (10) about an axis (x-axis) lying in the door plane (xz-plane).

25

38. Method according to claim 36 or 37 characterised in that when fitting together the door module (1 - 4) and door body (9) the position of the door module (1 - 4) relative to the door body (9) is adjusted solely in the door plane (xz-plane).

30

39. Method according to one of claims 36 to 39 characterised in that when assembling and adjusting the individual door elements (1 - 4, 9, 10) gauges are used by

[illegible]

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Fig. 1

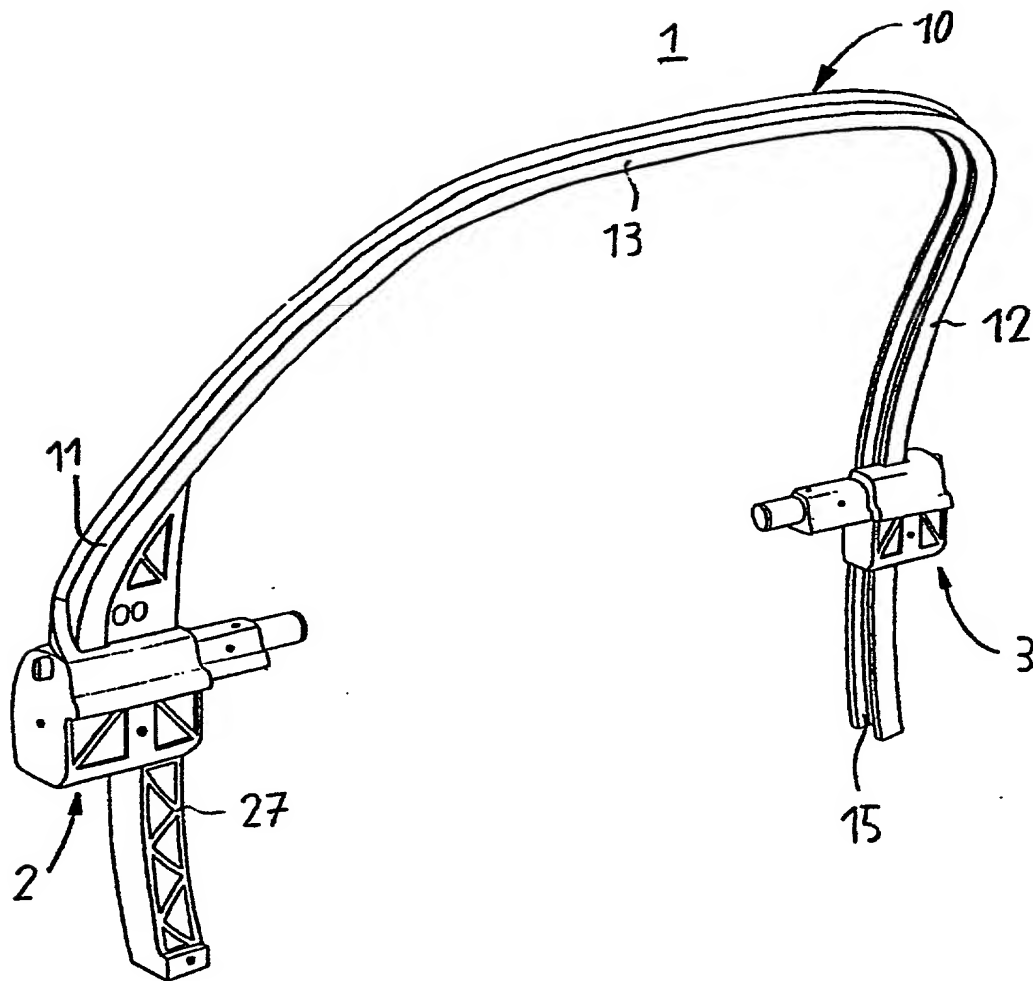


Fig. 2

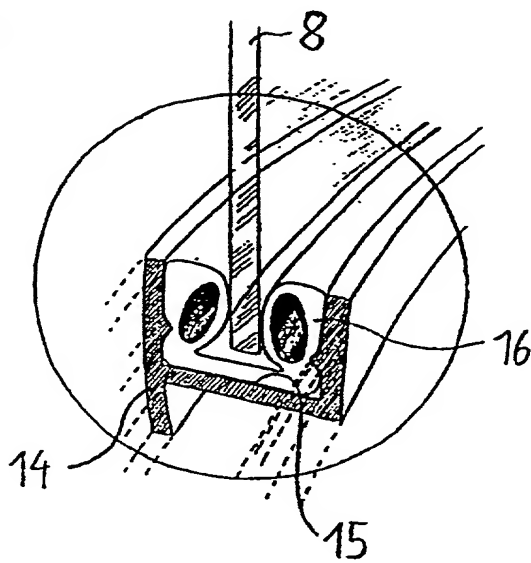
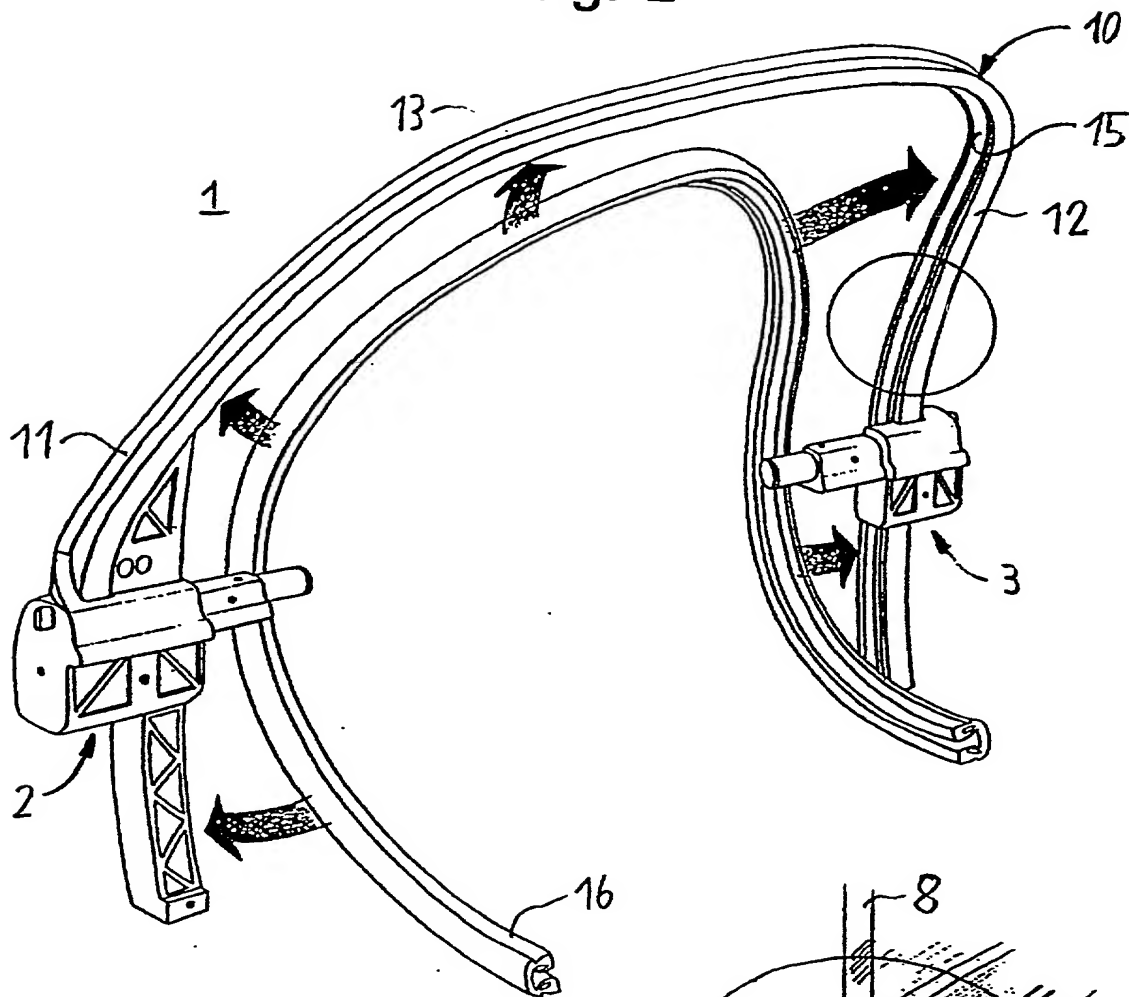


Fig. 3

Fig. 4

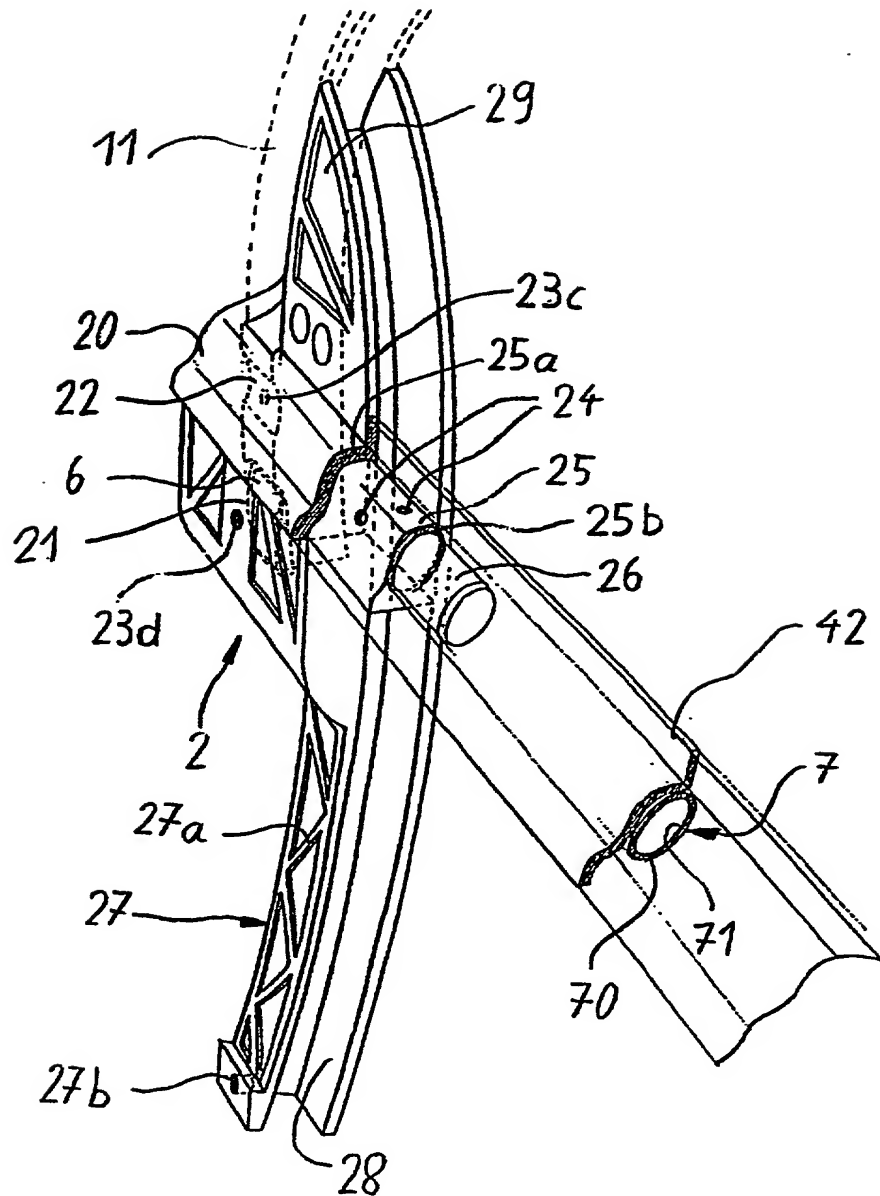


Fig. 5

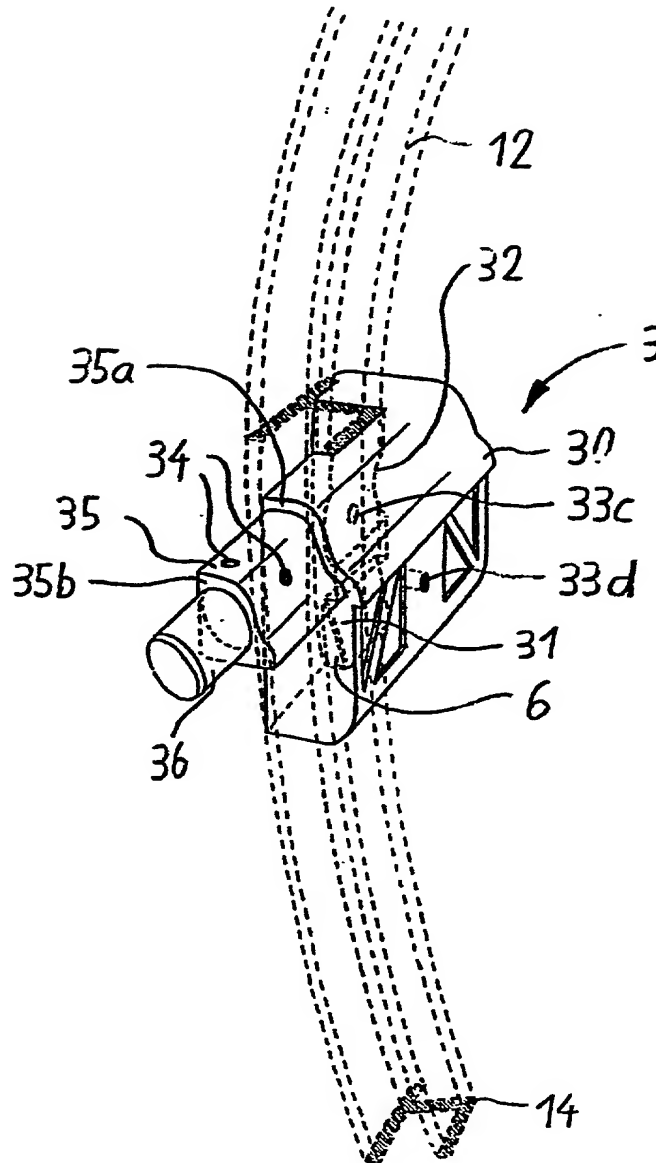


Fig. 6

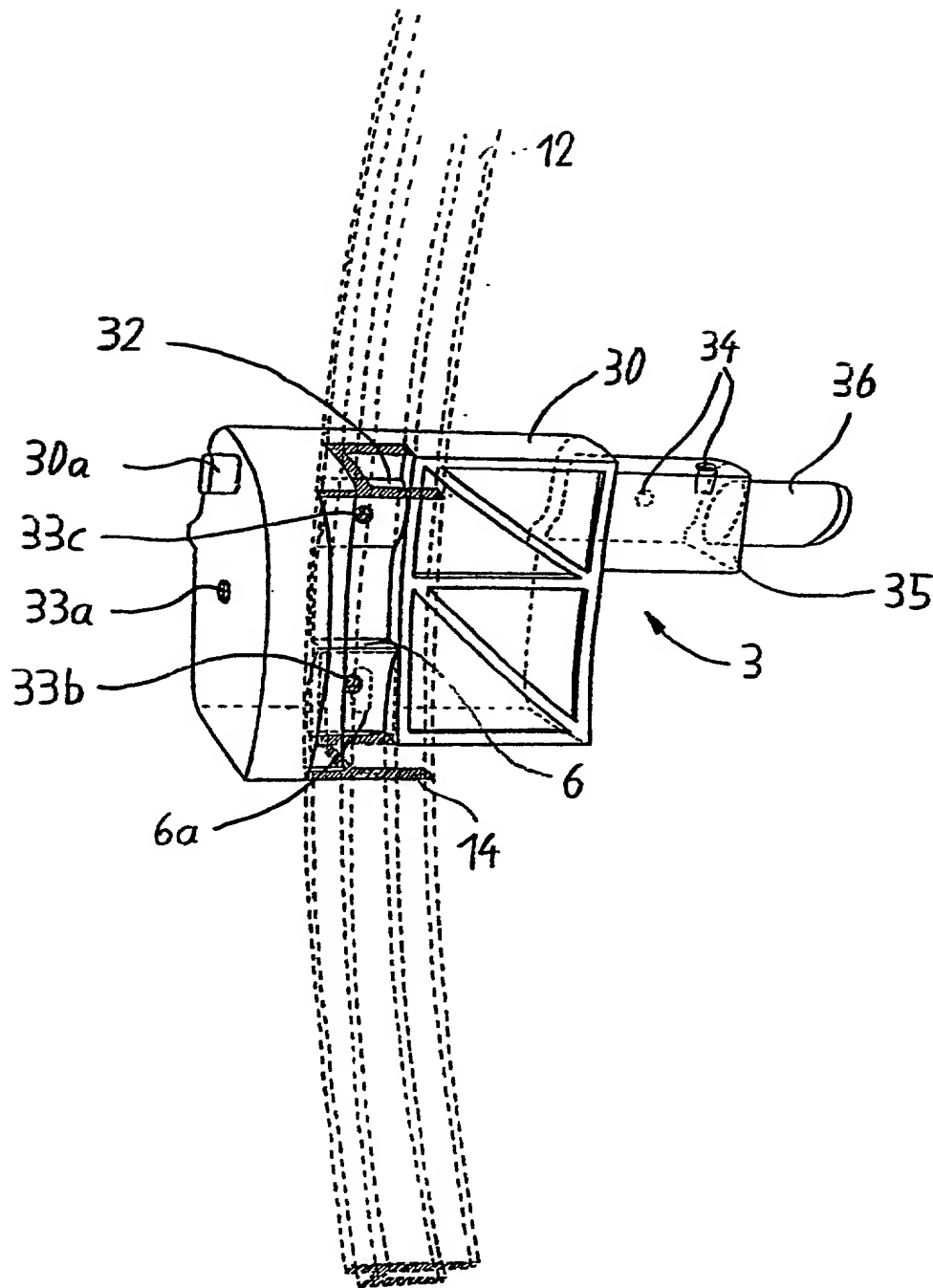


Fig. 7

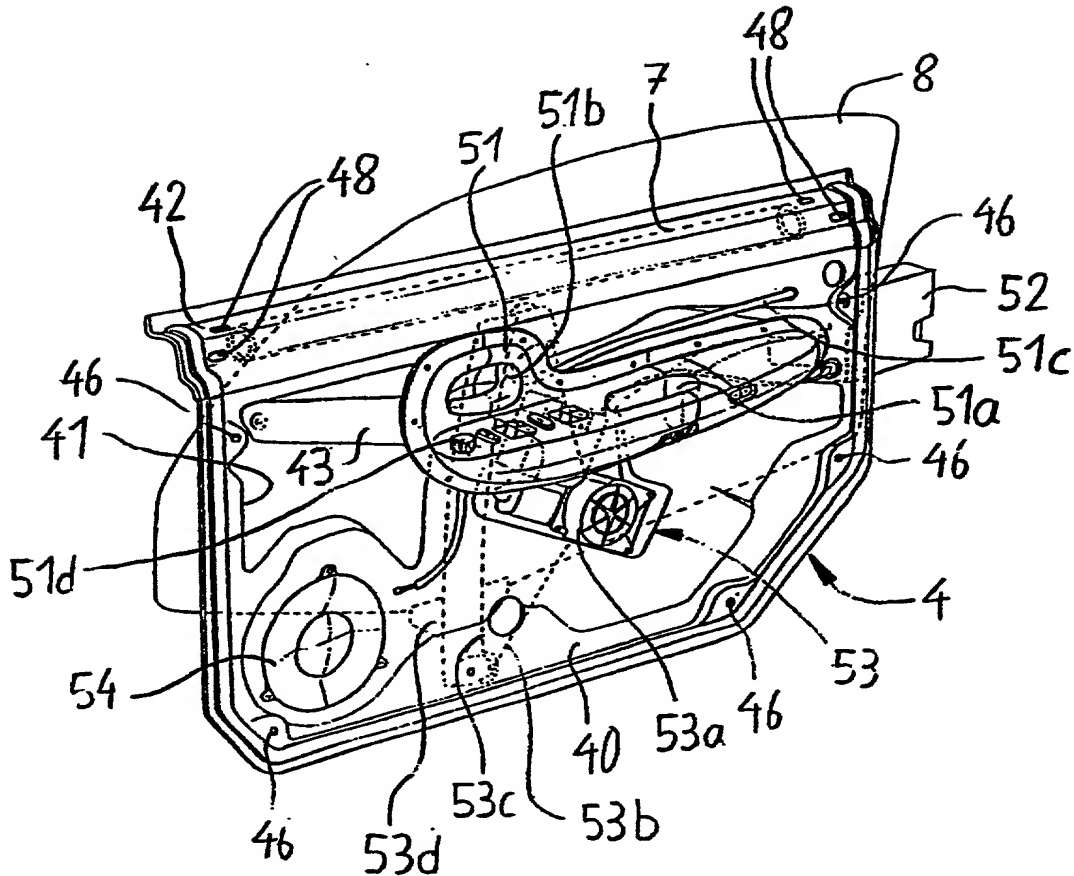
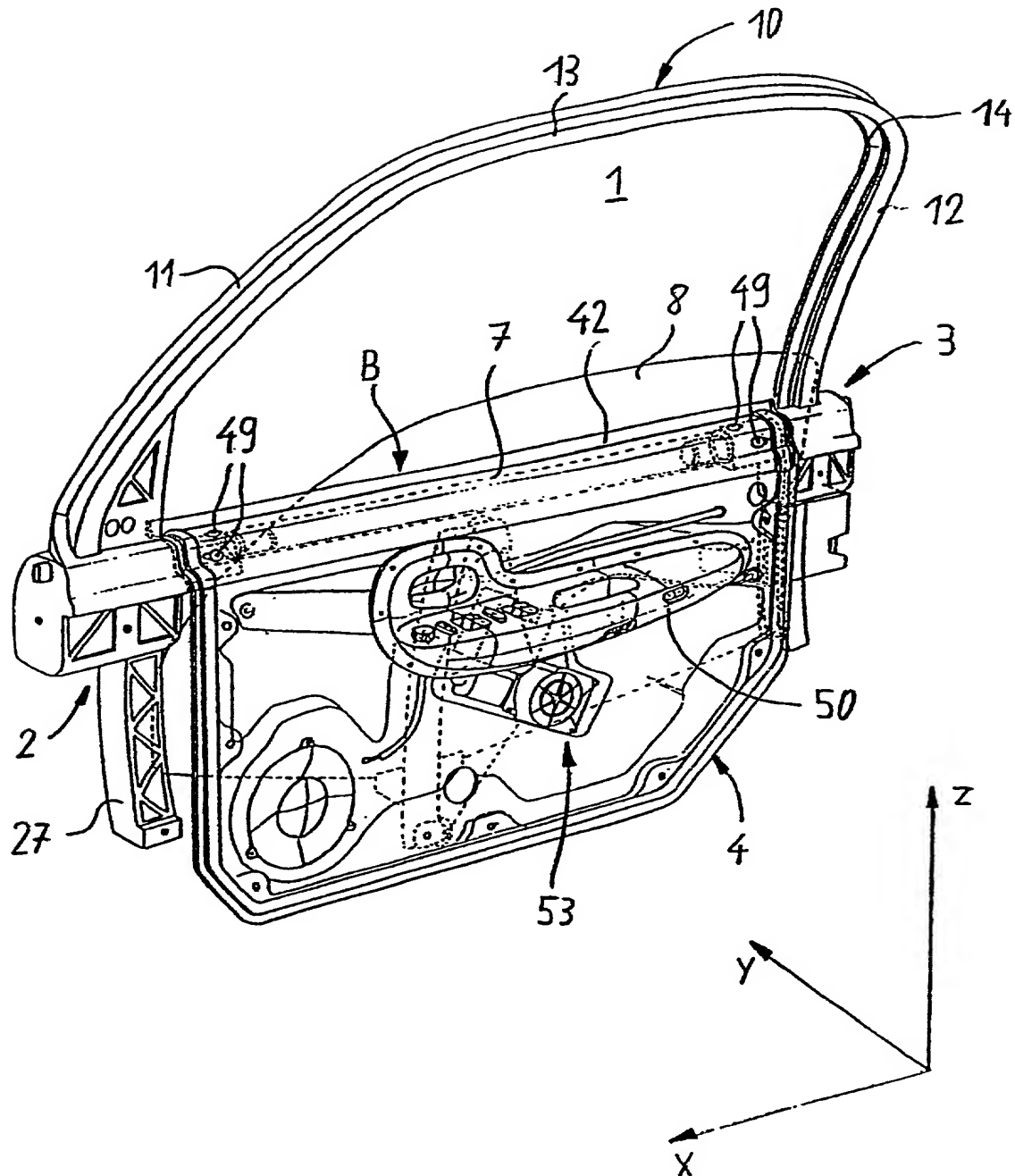
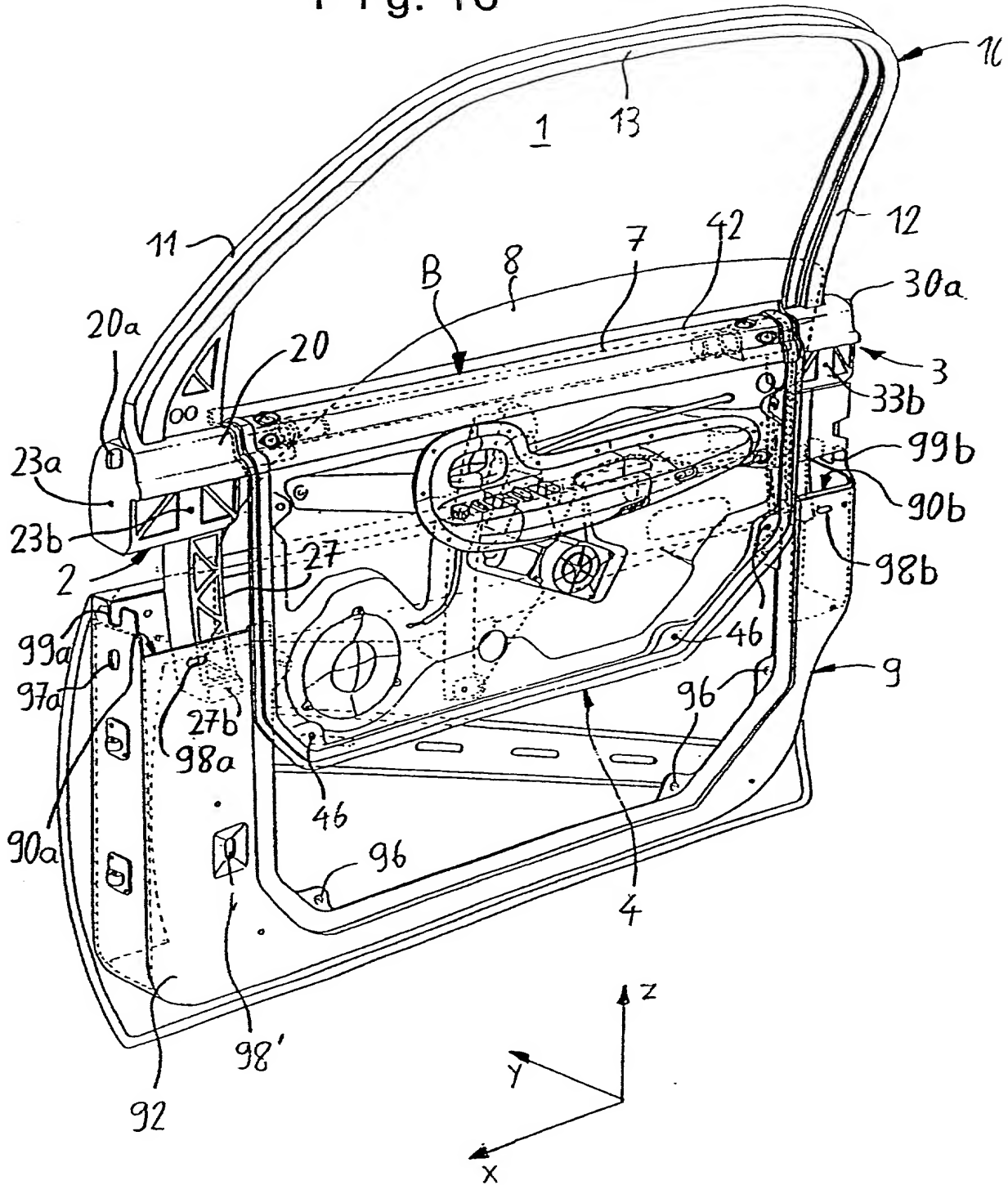


Fig. 8



10/069915

Fig. 10



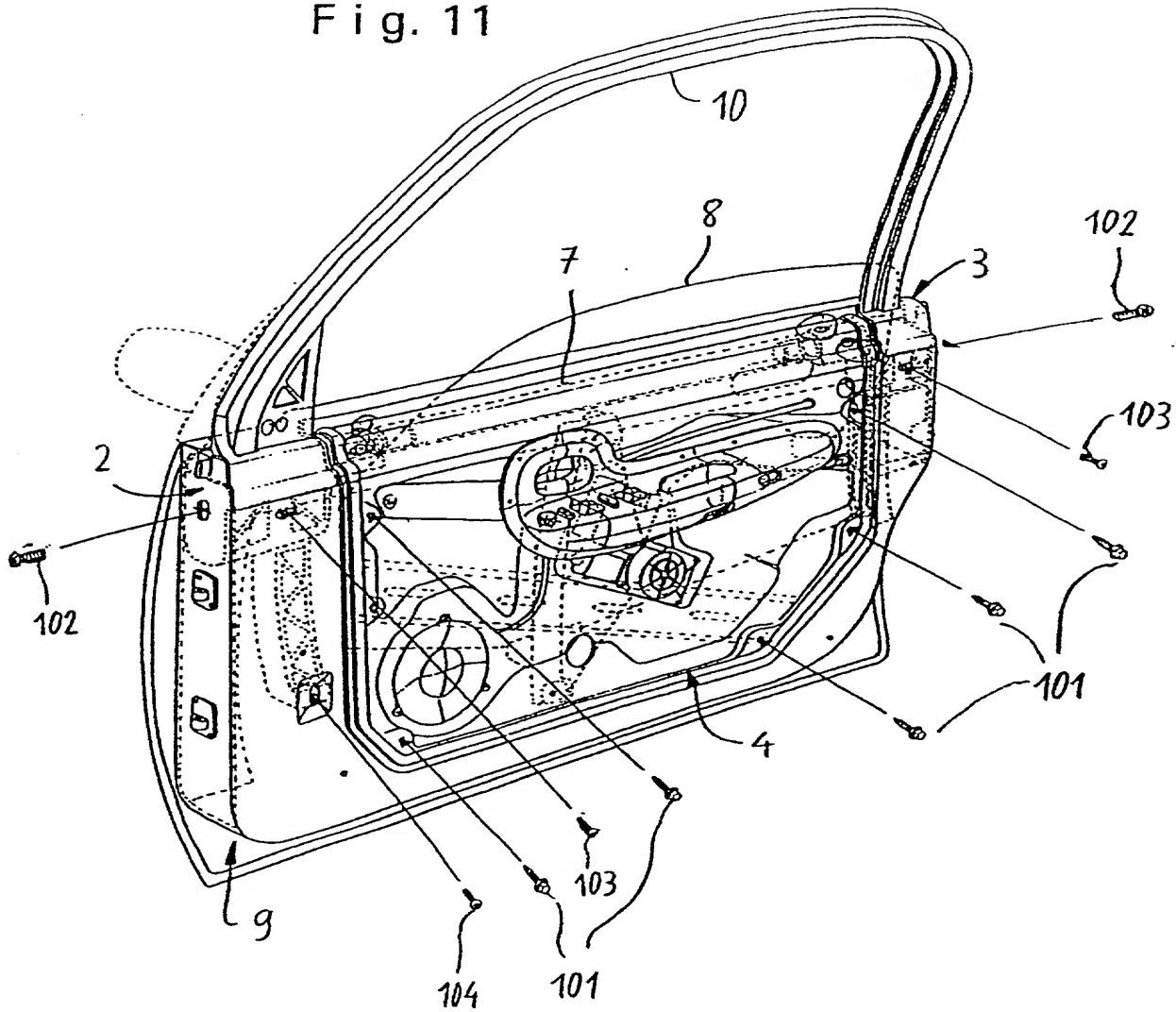
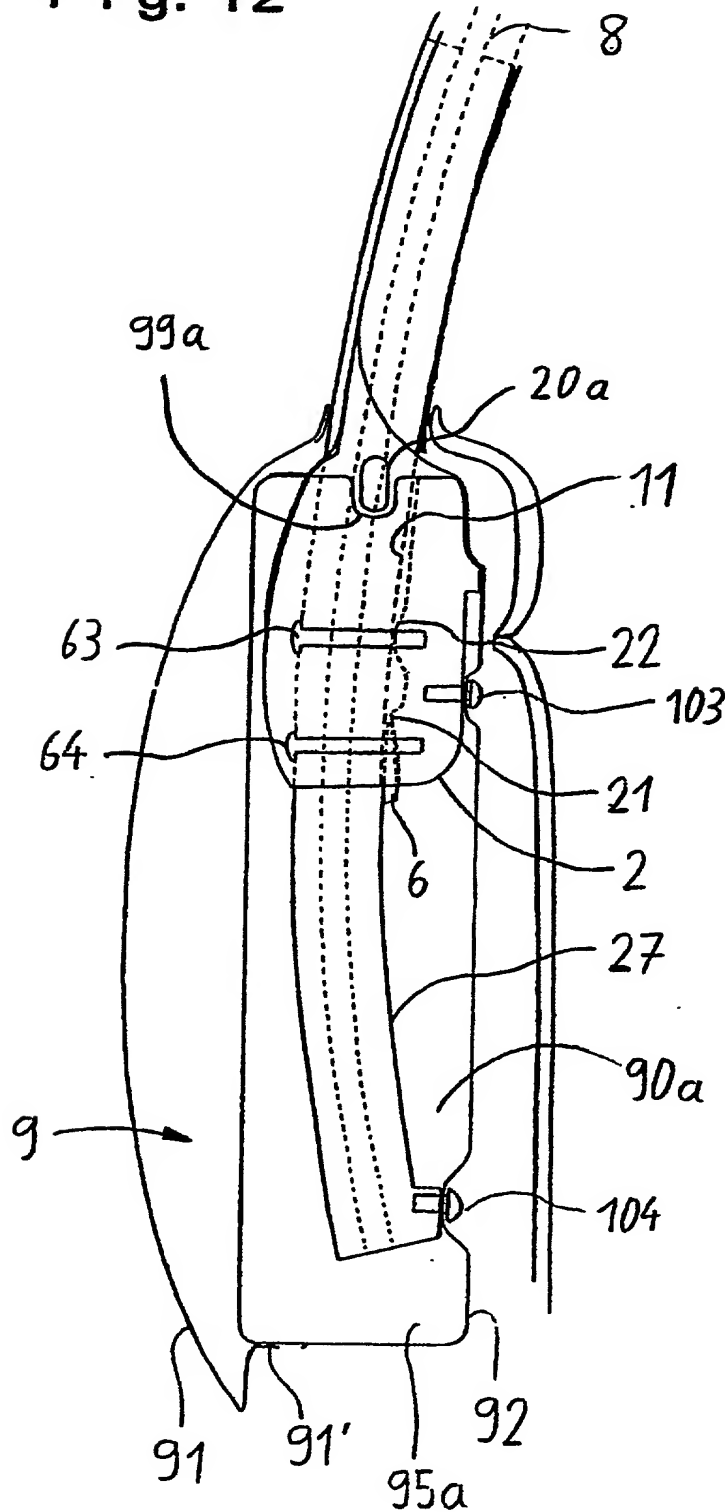
[illegible]

Fig. 12



DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION

PATENT

Docket No.: 47898/DBP/M521

As a below named inventor, I hereby declare that:

My residence, mailing address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled DOOR MODULE FOR FIXING TO A DOOR BODY FORMING A BASE COMPONENT OF A MOTOR VEHICLE DOOR AND METHOD FOR ASSEMBLING A DOOR MODULE OF THIS KIND, the specification of which is attached hereto unless the following is checked:

☒ was filed on August 30, 2000 as United States Application Number or PCT International Application Number PCT/DE00/03053 and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of the foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below, any foreign application for patent or inventor's certificate, or any PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

<u>Application Number</u>	<u>Country</u>	<u>Filing Date (day/month/year)</u>	<u>Priority Claimed</u>
199 42 650.3	Germany	30 August 1999	YES

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

<u>Application Number</u>	<u>Filing Date</u>
---------------------------	--------------------

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112.

<u>Application Number</u>	<u>Filing Date</u>	<u>Patented/Pending/Abandoned</u>
---------------------------	--------------------	-----------------------------------

POWER OF ATTORNEY: I hereby appoint the following attorneys and agents of the law firm CHRISTIE, PARKER & HALE, LLP to prosecute this application and any international application under the Patent Cooperation Treaty based on it and to transact all business in the U.S. Patent and Trademark Office connected

**DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION**

Docket No. 47898/DBP/M521

with either of them in accordance with instructions from the assignee of the entire interest in this application; or from the first or sole inventor named below in the event the application is not assigned; or from MAIKOWSKI & NINNEMANN European Patent & Trademark Attorneys in the event the power granted herein is for an application filed on behalf of a foreign attorney or agent.

56

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I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION

Docket No. 47893/DBP/M521

1-00
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